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ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

Bartering for Entertainment

[1]

During the Great Depression, Robert Porterfield, a young actor from southwestern Virginia, was among the series of[1] actors in New York City who were unemployed. Porterfield was also familiar with the plight of farmers back home and many[2] farmers had livestock and produce in abundance but couldn't find buyers because money was scarce. [A] Porterfield reasoned that if he opened a theater in Virginia that accepted food for tickets, so[3] his actors could eat regularly. At the same time,[4] farmers would be able to enjoy quality entertainment they normally couldn't afford. [B] He convinced twenty-two of his colleagues to move from New York to Virginia to[5] participate in this experiment in bartering.

1. Which choice most strongly emphasizes that unemployment was widespread among actors in New York City?
   - **A.** NO CHANGE
   - **B.** numbered
   - **C.** countless
   - **D.** cast of

2. **F.** NO CHANGE
   - **G.** home. Many
   - **H.** home, many
   - **J.** home many

3. **A.** NO CHANGE
   - **B.** while
   - **C.** then
   - **D.** than

4. **F.** NO CHANGE
   - **G.** In spite of this,
   - **H.** For instance,
   - **J.** That is,

5. **A.** NO CHANGE
   - **B.** Virginia. In order to
   - **C.** Virginia. To
   - **D.** Virginia; to

[2]

[C] Barter Theater opened in June 1933 in a vacant church in Abingdon, Virginia. The price of admission to a Barter production was "40 cents or the equivalent in produce." Tickets for the first performance sold out, along with[6] four out of five patrons paying for their tickets with vegetables, livestock, or dairy products. [D]

[3]

Porterfield also convinced playwrights to take food in lieu of their usual cash royalties. For example, renowned writers such as Tennessee Williams, Rachel Crothers, and Clare Boothe Luce received payment in Virginia hams. George Bernard Shaw, a vegetarian, accepted his royalties in spinach. By the end of their first season, Porterfield's actors[7] had managed to earn a profit of only $4.35. The actors will,[8] however, have two barrels of jelly and a collective weight gain of three hundred pounds to show for their efforts. [9]

6. **F.** NO CHANGE
   G. as well as
   H. with
   J. so

7. **A.** NO CHANGE
   B. Porterfield's actor's
   C. Porterfields actor's
   D. Porterfields actors

8. **F.** NO CHANGE
   G. actors did,
   H. actors do,
   J. actors,

9. If the writer were to delete the preceding sentence, the paragraph would primarily lose:
   A. the suggestion that Porterfield had stopped allowing farmers to pay for their tickets using livestock.
   B. an illustration that implies the Barter Theater experiment was successful.
   C. the suggestion that Porterfield paid some playwrights with jelly instead of ham.
   D. a list of the types of food the actors received during their first season.

[4]

The Virginia General Assembly honored Barter Theater in 1946 by designating it the State Theater of Virginia. Many successful actors have gotten their start at the Barter [11]. Today, the theater acknowledges its bartering tradition by collecting nonperishable food items in exchange for tickets for at least one performance per year. Many new plays are debuted at Barter Theater.

10. **F.** NO CHANGE
G. Designating it the State Theater of Virginia, the Barter Theater was honored by the Virginia General Assembly in 1946.
H. By designating it the State Theater of Virginia, 1946 was the year the Virginia General Assembly honored the Barter Theater.
J. Honoring Barter Theater, the State Theater of Virginia was what it was designated by the Virginia General Assembly in 1946.

11. At this point, the writer is considering adding the following accurate information:

> including Oscar winners Ernest Borgnine and Kevin Spacey

Assuming that a comma would be added after the word *Barter*, should the writer make this addition here?

A. Yes, because it helps explain why the Barter Theater scaled back its practice of bartering.
B. Yes, because it provides support for the claim being made in the sentence.
C. No, because it detracts from the paragraph's focus on the Barter Theater.
D. No, because it provides a level of detail that's inconsistent with the rest of the essay.

12. **F.** NO CHANGE
G. its's
H. it's
J. its'

13. Given that all the choices are true, which one most logically concludes the paragraph?

A. NO CHANGE
B. The Barter Theater was closed for a time during World War II after Porterfield had been drafted.
C. The actors don't eat these profits, however; they donate them to local food banks.
D. Porterfield was one of the founders of the Virginia Highlands Festival.

Question 14 asks about the preceding passage as a whole.

14. Upon reviewing the essay and finding that some information has been left out, the writer composes the following sentence incorporating that information:

> It's believed that the first ticket was purchased with a small pig.

If the writer were to add this sentence to the essay, it would most logically be placed at Point:

F. A in Paragraph 1.
G. B in Paragraph 1.
H. C in Paragraph 2.
J. D in Paragraph 2.

PASSAGE II

A Haven in Hummingbird Heaven

[1]

Since the Patagonia-Sonoita Creek Preserve in southeastern Arizona has a diversity of vegetation—valley, desert, and mountain—and provides habitat for a wide range of wildlife that includes: mountain lions, coyotes, tortoises, rare fish, and some 300 species of birds. [A] Among the bird species that frequent the Patagonia area are fifteen kinds of hummingbirds. In fact, this small corner of Arizona, one of the busiest hummingbird rest stops in North America, that is known as Hummingbird Heaven. [B]

[2]

Each fall, as they travel to their winter homes, tens of thousands of these tiny fliers stop in Patagonia to fatten up on their way to Mexico for the winter. In spring, they will visit again as they head north to their summer homes. [C] Hummingbirds weigh only 2 to 19 grams, the equivalent of a few dimes, but they have the fastest wing beat of any bird, up to 80 beats per second, and require constant refueling.

[3]

[20] Paton, a retired school cafeteria manager, created a 2.5-acre hummingbird oasis behind her small rural house several years ago.

15. **A.** NO CHANGE
B. Although the
C. While the
D. The

16. **F.** NO CHANGE
G. includes the following
H. includes,
J. includes

17. **A.** NO CHANGE
B. For example,
C. Later,
D. Next,

18. **F.** NO CHANGE
G. which has been
H. is
J. DELETE the underlined portion.

19. **A.** NO CHANGE
B. after starting on their flight to Mexico,
C. needing to fatten up for their journey,
D. DELETE the underlined portion.

20. Which of the following true statements, if added here, would provide the most effective transition from the preceding paragraph to this paragraph?

F. Marion Paton has not seen numbers drop, despite increasing threats to migration routes.
G. One place to fill up, just down the road from the entrance to the Patagonia Preserve, is Marion Paton's backyard.
H. Hummingbirds also have the fastest heartbeat of any bird: nearly 1,260 beats per minute when in motion.
J. If food is scarce, a hummingbird might guard a patch of flowers it has found.

Her yard gives human visitors a chance to observe the resplendence hummingbirds up close.

21. A. NO CHANGE
B. resplendent
C. resplendently
D. resplendenter

However, bird watchers can find Paton's yard by looking for the handmade "Birder's Haven" sign on her chain-link fence. If the gate is open, all are welcome to enter. In return, Paton asks for a small donation to help her buy sugar water for the birds. Her affectionately jokes that tending to the hungry birds, which often consume several quarts of sugar water a day is like running a boarding house.

22. F. NO CHANGE
G. Moreover, bird
H. Secondly, bird
J. Bird

23. A. NO CHANGE
B. She affectionately
C. Her affectionate
D. She affectionate

24. F. NO CHANGE
G. day, is like running
H. day, is like running,
J. day is like running,

[4]

In spring and fall, Paton refills rows of hummingbird feeders with sugar water, she does so throughout the day as she talks with visitors, telling them about the types of hummingbirds that may be spotted in her yard. [D] Lucky birders might see a broad-billed, a black-chinned, or someone watching the birds could indeed sight a striking violet-crowned hummingbird. Occasionally, representatives of almost all North American hummingbird species can be seen together, feeding in Paton's backyard haven.

25. A. NO CHANGE
B. water it happens
C. water
D. water,

26. F. NO CHANGE
G. might have saw
H. might of seen
J. had saw

27. A. NO CHANGE
B. along with those other hummingbirds they might possibly spot
C. exceptionally
D. even

28. Which of the following alternatives to the underlined portion would NOT be acceptable?
F. Once in a while,
G. Now and then,
H. Sometimes,
J. Sparsely,

GO ON TO THE NEXT PAGE

Question 29 asks about the preceding passage as a whole.

29. Upon reviewing the essay and finding that some information has been left out, the writer composes the following sentence incorporating that information:

> On a whiteboard by the feeders, she keeps a list of the species of hummingbirds most recently seen on her property, and she invites visitors to add to the list.

If the writer were to add this sentence to the essay, it would most logically be placed at Point:

A. A in Paragraph 1.
B. B in Paragraph 1.
C. C in Paragraph 2.
D. D in Paragraph 4.

PASSAGE III

The Fastest Bicycle Rider in the World

At the turn of the twentieth century, the most popular spectator sport in the United States wasn't football or baseball: it was bicycle racing. During that golden age of cycling, crowds of over twenty thousand gathered at tracks around the country to watch its' favorite athletes
30

compete. [31] One cyclist, Marshall "Major" Taylor, a young African American man from Indianapolis, was a popular racer.
32

30. **F.** NO CHANGE
G. his or her
H. there
J. their

31. If the writer were to delete the phrases "of over twenty thousand" and "around the country" from the preceding sentence, the paragraph would primarily lose details that:

A. describe a particularly well-attended cycling event that was talked about across the United States.
B. indicate the popularity of cycling as a spectator sport at the turn of the twentieth century.
C. explain why people liked to watch bicycle races at the turn of the twentieth century.
D. provide information about one of Taylor's most spectacular races.

32. Given that all the choices are true, which one makes clear that Taylor was unmatched in his ability to attract spectators to a bicycle race he was participating in?

F. NO CHANGE
G. drew more fans to a race than did any other competitor.
H. would awe spectators with his moves as he competed.
J. was a participant in many of the major races.

[1] His skills attracted the attention of a bicycle shop owner, whom (33) hired Taylor to demonstrate stunts and help around the store. [2] Taylor got his start in cycling when he received a bicycle as a gift from his father's employer. [3] He soon excelled both at riding and at complicated stunts, such as standing on the handlebars. [4] That same year, 1892, (34) the shop owner encouraged Taylor, then thirteen, (35) to enter his first road race. [5] He won. [36]

At fifteen, Taylor won a seventy-five-mile amateur road race and set a one-mile record at Indianapolis's Capital City track. After competing in Indiana and Illinois for another two years, when (37) Taylor relocated to Worcester, Massachusetts, with Louis Munger, a bicycle manufacturer and retired cyclist who had seen Taylor compete. (38) Munger, who planned to open a bicycle factory in Worcester, knowing (39) that there would be better racing opportunities on the East Coast (40) for Taylor.

Taylor turned pro at eighteen and began competing all over the United States. By 1899, he held seven world records.

33. A. NO CHANGE
B. whom then
C. who
D. and

34. F. NO CHANGE
G. 1892, and
H. 1892;
J. 1892

35. Which of the following alternatives to the underlined portion would NOT be acceptable?

A. Taylor, who was thirteen,
B. Taylor—then thirteen—
C. Taylor, then thirteen
D. Taylor, thirteen,

36. For the sake of the logic and coherence of this paragraph, Sentence 1 should be placed:

F. where it is now.
G. after Sentence 2.
H. after Sentence 3.
J. after Sentence 4.

37. A. NO CHANGE
B. after that
C. so then
D. DELETE the underlined portion.

38. Given that all the choices are true, which one most clearly and effectively establishes the personal and business relationship between Munger and Taylor?

F. NO CHANGE
G. had become Taylor's close friend and racing manager.
H. had been manufacturing bicycles for decades.
J. believed Taylor was talented.

39. A. NO CHANGE
B. and he knew
C. in knowing
D. knew

40. All of the following placements for the underlined portion would be acceptable EXCEPT:

F. where it is now.
G. after the word *that*.
H. after the word *better*.
J. after the word *Taylor* (and before the period).

Taylor often outsmarted his competition by pretending to be tired or discouraged. [41] When his opponents relaxed, Taylor would rocket past them in a dazzling sprint to the finish. No one could beat him in a sprint, which is one reason fans flocked to see him.

Major Taylor, who would write an autobiography, went on to win races in Europe, Australia, and New Zealand. [44] In the last decade of his life, he wrote his autobiography, *The Fastest Bicycle Rider in the World*, which describes his career, expresses his views on good sportsmanship, and offers advice to young athletes.

41. If the writer were to delete the preceding sentence, the paragraph would primarily lose a statement that:

- **A.** helps explain a statement about Taylor's racing style that's made earlier in the paragraph.
- **B.** describes a specific instance in which Taylor outsmarted his competition.
- **C.** sets up information that follows in the next sentence.
- **D.** contributes a humorous tone to a mostly technical essay.

42. Which of the following alternatives to the underlined portion would NOT be acceptable?

- **F.** slackened their pace,
- **G.** eased up,
- **H.** reduced,
- **J.** let up,

43.
- **A.** NO CHANGE
- **B.** Taylor, who in his autobiography offered advice to young athletes,
- **C.** Taylor, who even won races in New Zealand,
- **D.** Taylor

44. At this point, the writer is considering adding the following true statement:

> In U.S. races of Taylor's day, groups of riders were forbidden to team up to physically block an opponent's path.

Should the writer make this addition here?

- **F.** Yes, because it makes clear that the rules of a U.S. bicycle race were different from those of a bicycle race in Europe.
- **G.** Yes, because it suggests that most riders honored the bicycle-racing regulations of the day.
- **H.** No, because it strays from the paragraph's focus on Taylor's racing techniques.
- **J.** No, because it isn't logically linked to the other information in the paragraph.

45.
- **A.** NO CHANGE
- **B.** he expresses
- **C.** to express
- **D.** express

PASSAGE IV

A Literary Challenge

[1] Dorothy West launched her literary journal *Challenge* in 1934 with just forty dollars.

46.
- **F.** NO CHANGE
- **G.** her, literary journal *Challenge*, in 1934,
- **H.** her, literary journal, *Challenge* in 1934,
- **J.** her literary journal: *Challenge*, in 1934

[2] Her goal was to revive the literary boom of the 1920s. (47)

Harlem Renaissance of which she had been apart. (48)

[3] West's plan relied on using young, emerging African American writers. Because (49) she hoped their fresh voices could take over (50) the intellectual and cultural excitement of that era. [4] She saw *Challenge* as "an organ of the new voice," the place for new writers to shine. [5] *Challenge*'s first issue, which debuted in March 1934, ended up featuring both established and emerging (51) writers. [6] West had decided that including a few well-known authors, such as Langston Hughes and Arna Bontemps, would attract more readers. [7] As planned, though, the issue really flashed its lights on (52) unknown writers, many of whom, including the Reverend Dr. Pauli Murray, the feminist and poet, would become famous participants in the civil rights movement. [53]

West had planned for the journal to run quarterly. The second issue, however, did not circulate until September 1934—three months late—because she was unable to acquire the well-crafted writing she sought from young writers. West came to rely on "tried and true voices" rather than (54) on the new authors they (55) had intended to highlight.

47. A. NO CHANGE
B. 1920s,
C. 1920s;
D. 1920s

48. F. NO CHANGE
G. a part.
H. apiece.
J. pieces.

49. A. NO CHANGE
B. writers—because,
C. writers; because
D. writers because

50. F. NO CHANGE
G. recapture
H. detain
J. gain

51. Which choice best supports the writer's point that the first issue of *Challenge* deviated from West's original plan for the magazine?
A. NO CHANGE
B. previously unpublished and therefore little-known
C. a variety of nonfiction essays by young
D. poetry and fiction by African American

52. F. NO CHANGE
G. issue's written stories were first off
H. issue tried to keep its focus on
J. issue paid attention with

53. The writer wants to divide this paragraph into two in order to separate the discussion of West's initial plans for *Challenge* from the discussion of its actual contents. The best place to begin the new paragraph would be at the beginning of Sentence:
A. 3.
B. 4.
C. 5.
D. 6.

54. F. NO CHANGE
G. rather then
H. other than
J. than

55. A. NO CHANGE
B. some
C. those
D. she

GO ON TO THE NEXT PAGE

From 1934 to 1937, *Challenge* appeared only on and off, and it was often criticized for being too conservative. In addition, the magazine struggled with funding. As a result, two issues were compiled but not published.

In 1937, in an attempt to save the magazine, West relaunched it under a different name with a new editor, Richard Wright, wanted *New Challenge* to be more progressive. His goal was to provide a forum for writers to express their political views and to promote increased social awareness.

One day, *New Challenge* did not survive. In fact, publication ceased after one issue because of financial difficulty. The Depression of the 1930s essentially ended both the Harlem Renaissance and West's attempt to revive its spirit.

56. Which choice most precisely identifies how few issues of the magazine were published?
F. NO CHANGE
G. five more times,
H. from time to time,
J. occasionally,

57. Which of the following alternatives to the underlined portion would NOT be acceptable?
A. making an attempt
B. for attempting
C. in attempting
D. attempting

58. F. NO CHANGE
G. editor—Richard Wright—
H. editor. Richard Wright
J. editor Richard Wright

59. A. NO CHANGE
B. Like its predecessor,
C. Each week,
D. For a time,

60. F. NO CHANGE
G. survive. In fact—
H. survive. In fact;
J. survive in fact

PASSAGE V

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 75 will ask you to choose where Paragraph 4 should most logically be placed.

Putting More Art on Display

[1]

The Metropolitan Museum of Art (the Met) in New York City divides its art collection into many departments, all of which have extensive gallery space. For example, the large American Decorative Arts department has twenty-five fully furnished rooms in the museum,

each in a different architectural style. Visitors can see a reception room from before the American Revolutionary War and a living room from 1915 designed, by the famous architect Frank Lloyd Wright. After all, these rooms are only a small portion of the collection of American Decorative Arts and an even smaller portion, of the Met's entire collection.

[2]

Artwork that isn't on display gets relegated to out-of-the-way storage areas where the art stays until it is exhibited. Variations in light, humidity, and temperature can damage the art. To stabilize the environmental conditions and open their stored collections to visitors, a growing number of museums are adopting a new way of storing artwork called "visual storage." This type of storage, unlike the space found in gallery exhibits, crowds many artifacts in glass cases or hangs artwork close together on walls.

[3]

The American Decorative Arts department at the Met store most of its collection in the Luce Center; in the American Wing of the museum.

61. A. NO CHANGE
B. designed
C. design,
D. design

62. F. NO CHANGE
G. These rooms, however,
H. These rooms, at last,
J. Also, these rooms

63. A. NO CHANGE
B. portion of the Met's
C. portion of the Mets,
D. portion of the Mets

64. Given that all the choices are true, which one provides the best lead-in to the next sentence?

F. NO CHANGE
G. with few or no environmental controls.
H. that the public cannot access.
J. or off-site locations.

65. A. NO CHANGE
B. has damaged
C. is damaging
D. damages

66. F. NO CHANGE
G. have stored
H. has stored
J. storing

67. A. NO CHANGE
B. collection, in the Luce Center;
C. collection, in the Luce Center
D. collection in the Luce Center

Any visitor can walk through and see items grouped
68

by category such as, glass, ceramics, oil paintings,
69
woodwork, and furniture. Information about each item

is available in the Luce Center on the visitor computers
70
in the center.

[4]

The Met is basic in limiting the amount of artwork
71
publicly displayed in its galleries. Art museums usually display less than 10 percent of their artwork at any one time. [72] So what happens to a piece of art when

it isn't on display in a museum?
73

[5]

Rather than being hidden, artworks such as cupboards from 1680 or vases from 1900 are now accessible for visitors to study or simply enjoy. Visual storage, at the Met and other museums protects the art
74
and benefits the community by moving art from closed vaults to the public eye.

68. Given that all the choices are true, which one best emphasizes a main goal of visual storage?

- **F.** NO CHANGE
- **G.** The American Decorative Arts department has items that are
- **H.** Basically, the Met has placed the items so they are
- **J.** In the American Wing's center, items are

69.
- **A.** NO CHANGE
- **B.** category, such as,
- **C.** category, such as
- **D.** category; such as

70.
- **F.** NO CHANGE
- **G.** for visitors to access
- **H.** to obtain
- **J.** DELETE the underlined portion.

71.
- **A.** NO CHANGE
- **B.** run-of-the-mill
- **C.** fairly typical
- **D.** medium

72. If the writer were to delete the preceding sentence, the essay would primarily lose:

- **F.** evidence that helps put the Met's storage practices into a broader context.
- **G.** a detail that adds specific information about the Met and the size of its collection.
- **H.** a factual detail about how visual storage increases museum attendance.
- **J.** a possible response to the question asked in the next sentence.

73.
- **A.** NO CHANGE
- **B.** they're not
- **C.** they aren't
- **D.** its not

74.
- **F.** NO CHANGE
- **G.** storage, at the Met,
- **H.** storage at the Met,
- **J.** storage at the Met

Question 75 asks about the preceding passage as a whole.

75. For the sake of the logic and coherence of this essay, Paragraph 4 should be placed:

- **A.** where it is now.
- **B.** before Paragraph 1.
- **C.** after Paragraph 1.
- **D.** after Paragraph 2.

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO YOUR FIGURING HERE.

1. The cost, in dollars, to paint a room that has an area to be painted of A square feet is $0.75A + 20h$, where h is the number of hours it takes to paint the room. What is the cost of painting a room that has an area to be painted of 120 square feet and takes 2 hours to paint?

   A. \$120
   B. \$122
   C. \$130
   D. \$160
   E. \$220

2. What is the least common denominator of the fractions $\frac{4}{15}$, $\frac{1}{6}$, and $\frac{3}{4}$?

   F. 20
   G. 60
   H. 90
   J. 120
   K. 360

3. Malik is building a frame for a rectangular picture that he painted, and he needs to know the perimeter of the picture. The length of the picture is 36 inches and the width is 24 inches. What is the perimeter, in inches, of the picture?

   A. 60
   B. 84
   C. 96
   D. 120
   E. 864

4. In $\triangle ABC$, the sum of the measures of $\angle A$ and $\angle B$ is 64°. What is the measure of $\angle C$?

   F. 26°
   G. 52°
   H. 64°
   J. 116°
   K. 128°

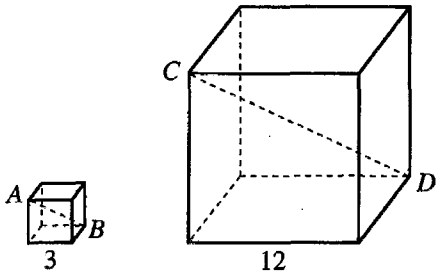
GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

5. On a map, $\frac{1}{4}$ inch represents 10 miles. How many inches on this map represent 250 miles?

   A. $2\frac{1}{2}$
   B. $6\frac{1}{4}$
   C. 25
   D. 40
   E. $62\frac{1}{2}$

6. The 2 cubes shown below have diagonals $\overline{AB}$ and $\overline{CD}$, respectively. The side lengths given are in feet. What is the ratio of the length of $\overline{AB}$ to the length of $\overline{CD}$?



   F. 1:4
   G. 1:16
   H. 4:1
   J. 16:1
   K. 64:1

7. What is the value of $-x + y + z$ for $x = -1$, $y = -3$, and $z = 2$?

   A. −6
   B. −2
   C. 0
   D. 4
   E. 6

8. If $9 + 3x = 27$, then $2x =$?

   F. 6
   G. 12
   H. 15
   J. 18
   K. 24

9. A woman purchased 100 shares of stock at \$5.00 per share. If each share rose \$0.10 the first month, decreased \$0.08 the second month, and gained \$0.03 the third month, what is the value of the woman's investment?

   A. \$ 505
   B. \$ 520
   C. \$ 525
   D. \$1,505
   E. \$1,545

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

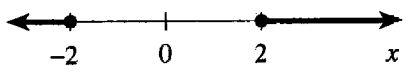
10. At Acme Manufacturing Company, each employee's annual salary for next year will be $3\frac{1}{2}\%$ more than this year's annual salary. An employee whose annual salary this year is $32,000.00 will have what annual salary next year?

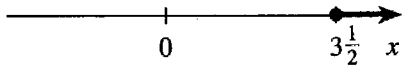
F. $32,003.50
G. $32,035.00
H. $32,350.00
J. $33,120.00
K. $41,600.00

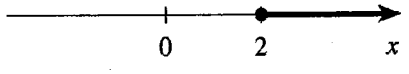
11. Vat 1, Vat 2, and Vat 3, when full, each hold the same amount of water. At the present time, Vat 1 is $\frac{5}{6}$ full, Vat 2 is $\frac{1}{12}$ full, and Vat 3 is $\frac{1}{3}$ full. Water will be transferred between the vats so that each of the 3 vats contains the same amount of water. After the transfer, each of the 3 vats will be what fraction full?

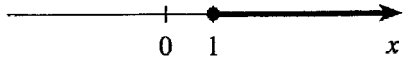
A. $\frac{1}{3}$
B. $\frac{1}{6}$
C. $\frac{1}{9}$
D. $\frac{5}{8}$
E. $\frac{5}{12}$

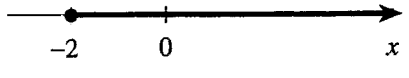
12. Which of the following graphs shows the solution set for the inequality $4x - 2 \geq 6$?

F.


G.


H.


J.


K.


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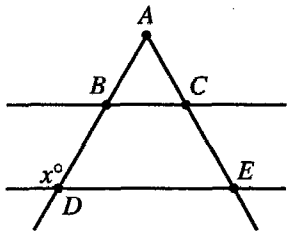
DO YOUR FIGURING HERE.

13. The Hope-A-Lot Foundation is mailing brochures to 4,000 prospective donors. The foundation's goal is to have proceeds of $1,500 after paying $900 for the mailing. According to past mailings, the average donation was $20 per donor. Assuming this average, how many of the prospective donors need to donate to reach the goal?

A. 30
B. 45
C. 120
D. 200
E. 1,500

14. Lines $\overleftrightarrow{BC}$ and $\overleftrightarrow{DE}$ are parallel, and transversals $\overleftrightarrow{BD}$ and $\overleftrightarrow{CE}$ intersect at A, as shown in the figure below. Given that $\triangle ABC$ is an equilateral triangle, $x = ?$



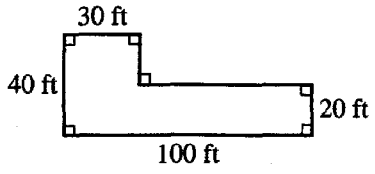
F. 30
G. 60
H. 120
J. 130
K. 150

15. What is the positive solution to the equation $16x^2 = 30$?

A. $\frac{30}{16}$
B. $\left(\frac{30}{16}\right)^2$
C. $\frac{\sqrt{30}}{16}$
D. $\sqrt{\frac{16}{30}}$
E. $\sqrt{\frac{30}{16}}$

16. If Kusum uses 1 pound of grass seed per 800 square feet to be seeded, how many pounds of grass seed will she use to seed the region shown below?

F. $3\frac{1}{4}$
G. 4
H. $4\frac{1}{4}$
J. $4\frac{3}{4}$
K. 5



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Use the following information to answer questions 17–20.

An organization promoting good nutritional habits collected data on fat calories in foods from 9 fast-food restaurants in Mesa City. The values in the list below represent the number of fat calories in a small order of french fries at each of these fast-food restaurants.

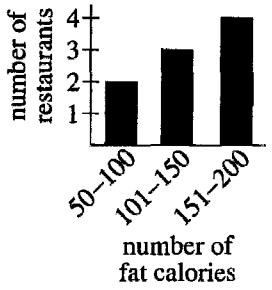
160, 106, 104, 113, 160, 103, 161, 89, 96

17. Based on the data listed, what is the median number of fat calories in a small order of french fries at these 9 restaurants?

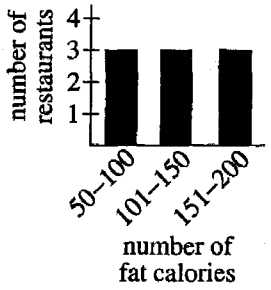
A. 106
B. 108
C. 125
D. 128
E. 160

18. Which of the following bar graphs most accurately represents the data on the number of fat calories in a small order of french fries at the 9 fast-food restaurants?

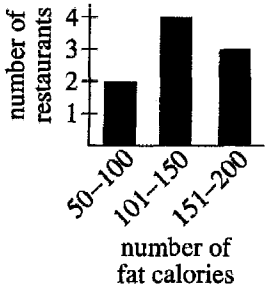
F.



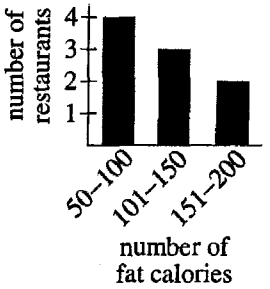
J.



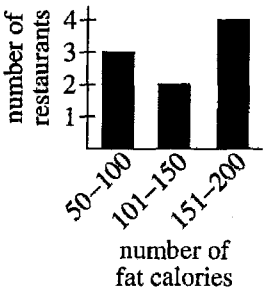
G.



K.



H.



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DO YOUR FIGURING HERE.

19. Of the 9 fast-food restaurants, Hungry Henry's has the lowest number of fat calories in a small order of french fries. At Henry's, 43% of the total number of calories in french fries are fat calories. Which of the following values is closest to the total number of calories in a small order of Henry's french fries?

A. 127
B. 132
C. 139
D. 207
E. 223

20. The organization collects data from 2 additional restaurants and includes the new data in the list. The number of fat calories in a small order of french fries at each of the 2 additional restaurants is designated by x and y, respectively. Which of the following expressions gives the average of this larger list of values?

F. $\frac{932+x+y}{10}$
G. $\frac{932+x+y}{11}$
H. $\frac{1{,}092+x+y}{9}$
J. $\frac{1{,}092+x+y}{9+x+y}$
K. $\frac{1{,}092+x+y}{11}$

---

21. A bag contains 8 red marbles, 5 yellow marbles, and 11 green marbles. How many additional red marbles must be added to the 24 marbles already in the bag so that the probability of randomly drawing a red marble is $\frac{3}{5}$?

A. 11
B. 16
C. 20
D. 24
E. 32

22. The sum of $(3x^3 + 4x^2 - 3x + 1)$ and which of the following polynomials results in the polynomial $(5x^3 - 4x^2 + 7x - 3)$?

F. $-2x^3 + 8x^2 - 10x + 4$
G. $2x^3 - 8x^2 + 10x - 4$
H. $2x^3 + 10x + 2$
J. $8x^3 + 4x - 2$
K. $15x^3 - 16x^2 - 21x - 3$

GO ON TO THE NEXT PAGE.

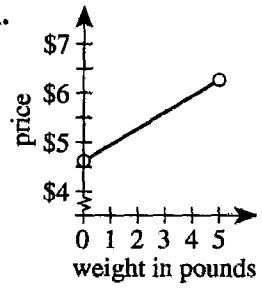
DO YOUR FIGURING HERE.

23. The table below gives the price to mail a single package through the United States Postal Service on August 30, 2007. The price depended on the weight of the package.

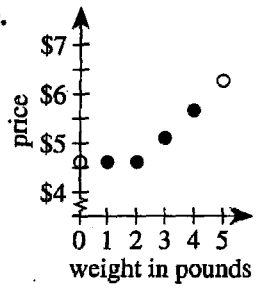
Weight in pounds	Price
$0 < x < 2$	\$4.60
$2 \leq x < 3$	\$5.05
$3 \leq x < 4$	\$5.70
$4 \leq x < 5$	\$6.30

Which of the following graphs best represents this information?

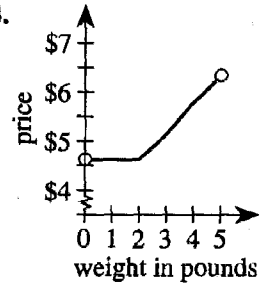
A.



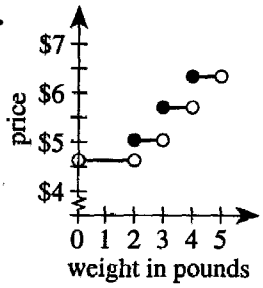
D.



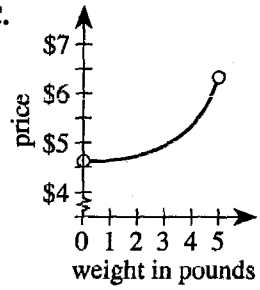
B.



E.



C.



24. What is the value of $f(-4)$ given $f(x) = 5x^2 - 2x + 10$?

F. −382
G. −62
H. 82
J. 98
K. 418

25. All of the following monomials are factors, over the integers, of $18x^2y + 12x^2y^3 - 6x^3y$ EXCEPT:

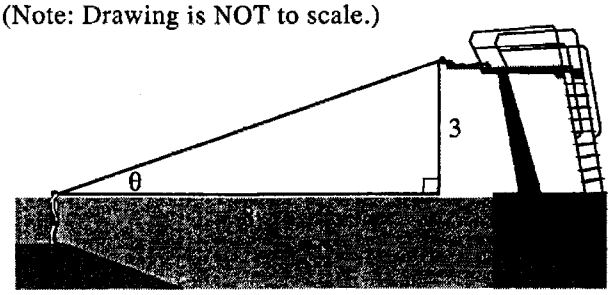
A. 6
B. $3x$
C. $2x^2$
D. $12x^2$
E. x^2y

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

26. Josh is standing in a pool and looking up at his friend Olivia. Olivia is lying on her stomach on the diving board looking at Josh. The horizontal and vertical distances, in meters, between Josh and Olivia are given in the diagram below. What is the measure of the angle of elevation, θ, of Josh's line of sight?

(Note: Drawing is NOT to scale.)



F. $\text{Arcsin}\left(\frac{3}{8}\right)$

G. $\text{Arccos}\left(\frac{3}{8}\right)$

H. $\text{Arctan}\left(\frac{3}{8}\right)$

J. $\text{Arccot}\left(\frac{3}{8}\right)$

K. $\text{Arccsc}\left(\frac{3}{8}\right)$

27. Avari traveled the 2-mile trail from her house to Big Lake on her bicycle. She then traveled 3 times around the Big Lake Loop and returned home by the 2-mile trail. At the end of her bicycle ride, the trip odometer showed that she had traveled 22 miles. Which of the following equations, when solved, gives the distance Avari traveled *once* around Big Lake Loop, d miles?

A. $2 + d = 22$
B. $2 + 3d = 22$
C. $4 - 3d = 22$
D. $4 + d = 22$
E. $4 + 3d = 22$

28. In the standard (x,y) coordinate plane, what is the slope of the line with equation $3x + 5y = 6$?

F. $-\frac{5}{3}$

G. $-\frac{3}{5}$

H. $\frac{3}{5}$

J. $\frac{5}{3}$

K. 2

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

29. What is the solution to the equation below?

$$3(x-4)-2(x-3)=5(-x-3)+6$$

A. $-\frac{5}{2}$

B. $-\frac{3}{2}$

C. $-\frac{1}{2}$

D. $\frac{3}{2}$

E. $\frac{9}{2}$

30. If $0 < x < 1$, and k is a positive integer, then what must be true about the value of x^k ?

F. $x^k < -1$

G. $-1 < x^k < 0$

H. $0 < x^k < 1$

J. $x^k > 1$

K. $x^k = 0$

31. For all $a \neq 0$, $\frac{(2a^2)^3+3a^4-5(a^2)^2}{2a} = ?$

A. $3a - a^3$

B. $4a^4 - a^3$

C. $3a^5 - a^3$

D. $4a^5 - 11a^3$

E. $4a^5 - a^3$

32. The diameter of Earth is about 1.28×10^4 km. The diameter of the Moon is about 3.5×10^3 km. Which of the following is closest to the difference, in kilometers, between the diameter of Earth and the diameter of the Moon?

F. 2.2×10^3

G. 2.2×10^4

H. 9.3×10^2

J. 9.3×10^3

K. 9.3×10^4

33. In the right triangle shown below, the length of $\overline{AC}$ is 4 mm and the length of $\overline{BC}$ is 3 mm. For $\angle A$, the value of which of the following trigonometric expressions is $\frac{3}{5}$?

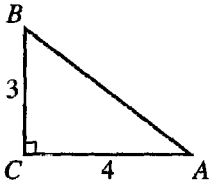
A. sin A

B. cos A

C. tan A

D. csc A

E. cot A



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DO YOUR FIGURING HERE.

34. When light shines on an object, the intensity of that light, I, in units of light intensity, can be expressed as $\frac{k}{d^2}$, where d is the distance, in feet, the light source is from the object, and k is a proportionality constant. For one light source shining on an object, $d = 12$ and $I = 10$. If $d = 6$ for the same light source shining on the same object, what is the corresponding value of I?

F. 20

G. $33\frac{1}{3}$

H. 40

J. 200

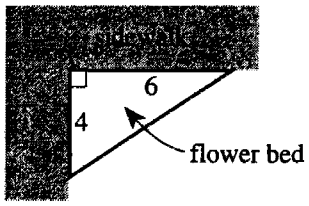
K. 1,440

35. A circle in the standard (x,y) coordinate plane has its center at $(-2,4)$ and passes through $(3,16)$. What is the area, in square coordinate units, of this circle?

A. 26π
B. 34π
C. 169π
D. 289π
E. 441π

36. Royce plans to construct a triangular flower bed on the corner of his property where a sidewalk forms a right angle. The flower bed and the lengths, in feet, of 2 of its sides are shown in the figure below. The flower bed will be enclosed by a garden fence that is set up along its entire perimeter. To the nearest foot, how many feet of garden fence will enclose the flower bed?

F. 12
G. 14
H. 16
J. 17
K. 20



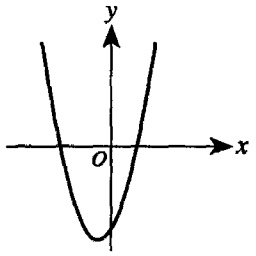
37. If $2w + 7 = |-2|$, how many different values are possible for w?

A. 0
B. 1
C. 2
D. 3
E. Infinitely many

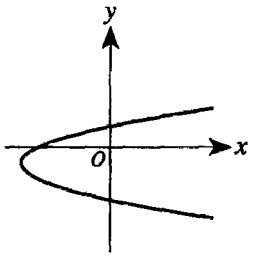
GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

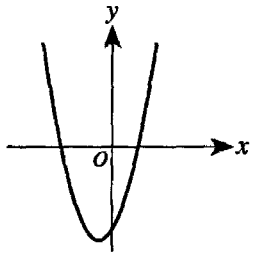
38. The graph of the parabola with equation $y = x^2 + 2x - 8$ is shown in the standard (x,y) coordinate plane below. One of the following graphs is the graph of the reflection of the parabola over the y-axis. Which one is it?



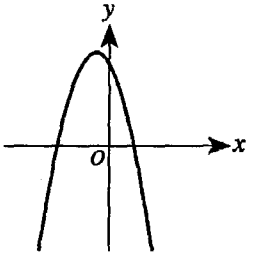
F.



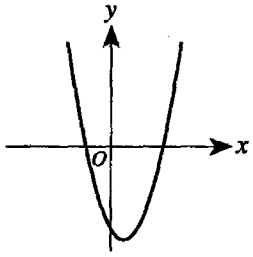
J.



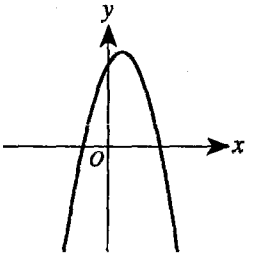
G.



K.



H.



39. The points $A(12,18)$ and $B(-4,2)$ lie in the standard (x,y) coordinate plane. What are the coordinates of the midpoint of $\overline{AB}$?

A. (4, 8)
B. (4,10)
C. (8, 8)
D. (8,20)
E. (16,16)

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

40. For $\triangle ABC$ shown below, the length of $\overline{BC}$ is 50 mm. Which of the following equations, when solved, will give the length, in millimeters, of $\overline{AB}$?

(Note: The law of sines states that given $\triangle XYZ$, $\frac{\sin \angle X}{YZ} = \frac{\sin \angle Y}{XZ} = \frac{\sin \angle Z}{XY}$.)

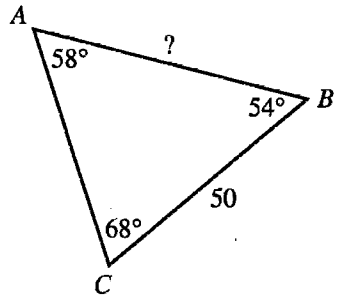
F. $\frac{\sin 68°}{50} = \frac{\sin 58°}{AB}$

G. $\frac{\sin 58°}{50} = \frac{\sin 68°}{AB}$

H. $\frac{\sin 58°}{50} = \frac{\sin 54°}{AB}$

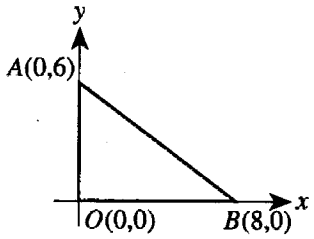
J. $\frac{\sin 54°}{50} = \frac{\sin 68°}{AB}$

K. $\frac{\sin 54°}{50} = \frac{\sin 58°}{AB}$



41. The vertices of $\triangle AOB$ are $A(0,6)$, $O(0,0)$, and $B(8,0)$, as shown in the standard (x,y) coordinate plane below. What are the coordinates of the center of the circle that circumscribes $\triangle AOB$?

A. (0,3)
B. (2,1.5)
C. (4,0)
D. (4,3)
E. (7,7)



42. Circle P has a radius of 4 units and is in the standard (x,y) coordinate plane. The set of all points in the coordinate plane that are 3 units from the center of Circle P is a circle that:

F. intersects Circle P at 2 points.
G. is internally tangent to Circle P.
H. is externally tangent to Circle P.
J. is interior to and does not intersect Circle P.
K. is exterior to and does not intersect Circle P.

43. Suppose that x is a positive real number and $\frac{4x}{6x^2}$ is a rational number. Which of the following statements about x *must* be true?

A. x is rational

B. x is irrational

C. $x = 1$

D. $x = \frac{2}{3}$

E. $x = \frac{3}{2}$

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

44. The functions f and g are defined as $f(x) = 3x + 2$ and $g(x) = 2x - 1$. What is the value of $f(g(-2))$?

F. 20
G. −4
H. −5
J. −9
K. −13

45. Consider all rectangles with an area of 36 square feet. P is the perimeter, in feet, of at least 1 of these rectangles if and only if:

A. $P \geq 6$
B. $P \geq 24$
C. $P \geq 36$
D. $P \geq 144$
E. $P \geq 324$

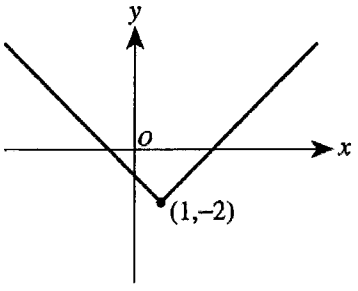
46. Carmen drove from Blairtown to Ore City, a distance of 80 miles. From Ore City she drove on to Janesville, and then drove back to Blairtown. The ratio of Carmen's driving times on the first, second, and third segments of the trip, respectively, was 5:2:4, and she drove at the same average speed on each segment. What was Carmen's total driving distance, in miles, for the 3 segments of the trip?

F. 176
G. 220
H. 240
J. 360
K. 440

47. In $\triangle ABC$, the measure of $\angle A$ is 43° and the measure of $\angle C$ is 32°. Which of the following inequalities involving the lengths of the sides of $\triangle ABC$ is true?

A. $AB > AC$
B. $AB > BC$
C. $AC > BC$
D. $AC > AB + BC$
E. $BC > AC$

48. One of the following functions is graphed in the standard (x,y) coordinate plane below. Which function is it?



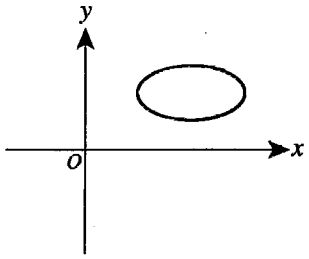
F. $y = |x - 1| - 2$
G. $y = |x + 1| - 2$
H. $y = |x + 1| + 2$
J. $y = |x - 2| + 1$
K. $y = |x + 2| - 1$

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

49. One of the following is an equation of the ellipse shown in the standard (x,y) coordinate plane below. Which one?

(Note: The coordinate unit on the x-axis is the same length as the coordinate unit on the y-axis.)



A. $x^2 - y^2 = 16$

B. $(x-8)^2 + (y-4)^2 = 16$

C. $\frac{(x+8)^2}{4} - \frac{(y+4)^2}{2} = 1$

D. $\frac{(x+8)^2}{16} + \frac{(y+4)^2}{4} = 1$

E. $\frac{(x-8)^2}{16} + \frac{(y-4)^2}{4} = 1$

50. A regular pyramid with a square base is shown in the figure below. The slant height is $\sqrt{3}$ units and the length of the base edge is 2 units. What is the total length, in units, of all 8 edges of the pyramid?

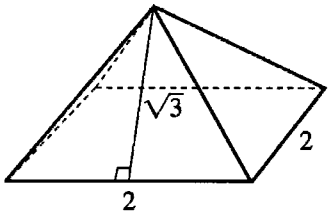
F. $4\sqrt{7}$

G. $4\sqrt{7} + 8$

H. 8

J. 14

K. 16



51. The solution of the system of equations below is the set of all (x,y) such that $2x - 3y = 6$. What is the value of k ?

$$\begin{aligned} 18x - 27y &= 54 \\ 6x + ky &= -2k \end{aligned}$$

A. −9

B. −1

C. 3

D. 6

E. 9

52. The solution set for the equation $2^{x^2+1} = 1$ contains:

F. 2 imaginary numbers.

G. 2 positive real numbers.

H. 1 negative and 1 positive real number.

J. 1 negative real number only.

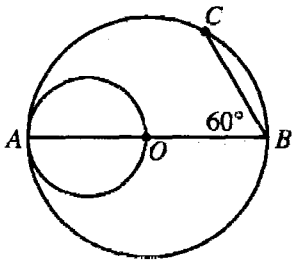
K. 1 real number, which is 0.

GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

Use the following information to answer questions 53–55.

In the figure below, a large circle with center O has a diameter $\overline{AB}$ that is 40 mm long. Point C lies on the large circle such that the measure of $\angle ABC$ is 60°. A diameter of the small circle is $\overline{AO}$.



53. What is the area, in square millimeters, of the small circle?

A. 10π
B. 20π
C. 40π
D. 100π
E. 400π

54. What is the length, in millimeters, of arc $\overset{\frown}{AB}$?

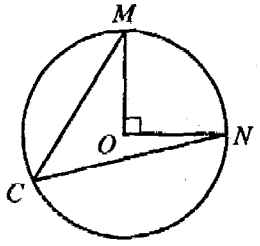
F. 20
G. 20π
H. 40
J. 40π
K. 80

55. The figure is placed in the standard (x,y) coordinate plane so that A has coordinates $(-20,0)$ and B has coordinates $(20,0)$. What is the x-coordinate of C ?

A. −15
B. −10
C. 0
D. 10
E. 15

---

56. In the figure shown below, C, M, and N lie on the circle whose center is O, and $\angle MON$ is a right angle. What is the sum of the measures of $\angle CMO$ and $\angle CNO$?



F. 90°
G. 67.5°
H. 60°
J. 45°
K. 22.5°

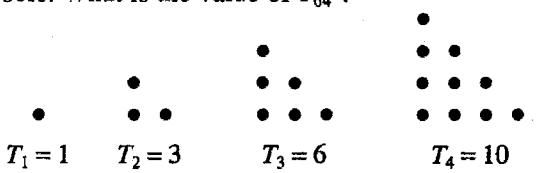
GO ON TO THE NEXT PAGE.

DO YOUR FIGURING HERE.

57. The length of the shorter side of rectangle $ABCD$ is 4 inches less than the length, L, of the longer side. The length of the longer side of rectangle $WXYZ$, which is similar to $ABCD$, is $10L$ inches. In terms of L, what is the length of the shorter side of $WXYZ$?

A. $L - 40$
B. $L + 6$
C. $10L - 4$
D. $10L + 6$
E. $10L - 40$

58. For any integer $n > 0$, the triangular number T_n is the number of dots in a triangular array with n points on each side. The figure below shows the first 4 triangular numbers. What is the value of T_{64} ?



F. 189
G. 192
H. 2,016
J. 2,048
K. 2,080

59. For what integer k are both solutions of the equation $x^2 + kx + 17 = 0$ positive integers?

A. −18
B. −16
C. 1
D. 16
E. 18

60. In $\triangle XYZ$, the measure of $\angle X$ is 90°, the measure of $\angle Z$ is θ, $XY = 12$ units, and $\tan\theta = \frac{4}{9}$. What is the area of $\triangle XYZ$, in square units?

F. 162
G. 324
H. $2\sqrt{65}$
J. $6\sqrt{585}$
K. $12\sqrt{585}$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

DIRECTIONS: There are four passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

PROSE FICTION: This passage is adapted from the novel *The Mozart Season* by Virginia Euwer Wolff (©1991 by Virginia Euwer Wolff).

The hair on a violin bow is the part of the bow, traditionally made of horsehair, that makes contact with the strings when the violin is played.

"Now that you're warmed up, let's revisit Mr. Mozart," said Mr. Kaplan.

It was a gorgeous June morning and in my mind I heard another voice: "Now that you're warmed up, let's demolish those Vikings." My softball coach and my violin teacher were overlapping each other.

With my softball coach, it was stairsteps and laps and endless batting practice. With Mr. Kaplan it was eight repetitions of very fast B-major scales and five minutes of octaves. Two weeks after being the shortstop on the team that had lost in the second round of the district play-offs, I was at my lesson, looking for the Mozart concerto.

In the summer I get to have morning lessons twice a week, and I love it. I work best in the mornings. Things haven't had time to get so cluttered yet.

I put the music on the stand and got ready. With Mr. Kaplan you don't whine or mutter. It doesn't help. "We want right notes, not excuses" is what all music teachers say, I guess. He doesn't have to say it very many times; you learn it fast. Mr. Kaplan and I'd been together for seven years, and he was going to know the instant I got to the top of the second page that I hadn't been practicing the Mozart. At that spot there's a fast shift from first finger to fourth finger on the G string, and you have to get ready for it. You can't let a shift like that take you by surprise.

"Straight through. Right, Allegra? Including cadenzas." A cadenza is the part where the violin plays alone; it's harder than the rest of the piece, and it gets the audience all excited when you do it in a concert. There are three cadenzas in this concerto, one in each movement.

"Right."

The introduction is forty-one measures long. This time, instead of playing just the last two measures of it on the piano, Mr. Kaplan played the whole thing. He wears half-glasses, and he has a balding head with some blondish-gray hair on the back, and a mostly gray short beard, and he's a little bit slumped over when he sits at the piano. His ears stick out in a funny way. I love the way he looks. The introduction to the first movement, the part the orchestra would play, mostly announces what the solo violin will play when it begins. That way you get to listen to it twice.

While he was doing it, I practiced the G-string shift without making any noise, sliding my hand up and down the fingerboard.

I love this concerto. Mozart only wrote five of them for the violin. The year before, Mr. Kaplan had let me choose which one to learn, the third one or this one, and I'd taken them both home and spun my bow the way you spin a tennis racquet. If it landed with the hair toward me, I'd learn the third, in G; and if it landed with the hair away from me, I'd learn this one. When Mr. Kaplan and my parents found out I'd treated my bow With Such Astonishing Disrespect, they got very alarmed about it.

I'd worked very hard on it for several months, and in February, we'd made a tape of it to send to a contest. I'd worried and fretted and trembled, but we'd gotten the tape made. After that, I'd sort of neglected it. In softball season I'd practically stopped being a violinist.

Mr. Kaplan, who was having fun playing the introduction, got to the BUM-*pum-pa-pum* part that comes right before the violin begins. I was ready. It starts on a high D and goes on up from there.

I got through the first movement all right, and I made some genuine messes of the beautiful double-stops near the end of the second-movement cadenza. Double-stops are two notes at once, on separate strings. And I was sure the last-movement cadenza was making it Abundantly Clear to Mr. Kaplan that I hadn't even seen it for a long time. But the end was fine. The *Blip-te-de-bip-bip-bip* came out very, very soft and nice.

Mr. Kaplan leaned back, smiling and saying a kind of "ah." Then he turned sideways on the bench. "Isn't this a beautiful song, Allegra?"

"Yep." It is. Mr. Kaplan calls overtures and symphonies and concertos "songs" sometimes. I waited for him to say the rest.

He leaned forward and flipped the pages. "Hmmm. I'm concerned about the articulation in spots, and some of the dynamics aren't at all what they should be and . . . Hmmm." Then he turned sideways on the bench again, straddling it. "Are you willing to play this concerto a thousand times by September?"

I laughed. That would be more times than I'd brush my teeth by then. He watched me thinking. He started to smile, then he got up and walked across the studio, away from me. Then he turned around. "Your tape was accepted," he said. "For the Bloch Competition. The finals are on Labor Day."

1. Based on the passage, which of the following happened to Allegra first chronologically?
   - A. She started the current year's summer music lessons.
   - B. Her softball team lost in the play-offs.
   - C. She selected the Mozart concerto she would study.
   - D. Her tape was sent off to the contest.

2. Which of the following statements about the relationship between Mr. Kaplan and Allegra is best supported by the passage?
   - F. He has high expectations of her, and she generally tries to do her best.
   - G. He pushes her until she can't take any more criticism.
   - H. He encourages her to do her best, but she worries about his open disapproval of her other interests.
   - J. He tries to motivate her to work hard, but she learns that people can motivate only themselves.

3. The passage suggests that concerning her current activities, Allegra feels:
   - A. delighted to be finished with softball, knowing that she won't ever have to play it again.
   - B. resigned to the end of softball season but eager for it to start again the next year.
   - C. accepting of the end of the softball season and ready to enjoy music for the summer.
   - D. exhausted by the demands that both softball and music have made on her.

4. Allegra states that Mr. Kaplan will know she hasn't practiced the concerto if:
   - F. the dynamics in her playing are unacceptable.
   - G. she has trouble playing the first movement's cadenza fast enough.
   - H. her tape doesn't sound good enough.
   - J. she isn't ready for the shift on the second page.

5. In the context of the passage, Allegra's statement in lines 42–45 indicates her:
   - A. boredom with hearing Mozart over and over.
   - B. exasperation with Mr. Kaplan for taking so much time with the introduction.
   - C. interest in figuring out how to memorize the concerto.
   - D. knowledge of one aspect of Mozart's method of constructing music.

6. According to the passage, while Allegra practices the shift, Mr. Kaplan plays:
   - F. the cadenza that the orchestra would normally play.
   - G. a Mozart piece written specifically for the piano.
   - H. the full introduction that the orchestra would normally play.
   - J. two measures of the introduction on the piano.

7. The author capitalizes the words in line 57 most likely to signify that:
   - A. Allegra especially loved her violin bow.
   - B. these are Allegra's own words, not her teacher's.
   - C. these are the adults' words, as Allegra interprets them.
   - D. Allegra spoke these words very loudly.

8. Mr. Kaplan asks Allegra if she is willing to "play this concerto a thousand times by September" (lines 86–87) most likely because he is:
   - F. joking, given that he thinks she already knows the concerto well enough.
   - G. gauging her interest in the work it will take to play the concerto significantly better.
   - H. already tired of hearing her practice this concerto.
   - J. afraid that sports will keep her from practicing the violin after September.

9. Allegra mentions all of the following physical characteristics of Mr. Kaplan EXCEPT that he:
   - A. has a long gray beard.
   - B. wears half-glasses.
   - C. slumps slightly when he sits.
   - D. has ears that stick out.

10. In the passage, Allegra indicates that she practiced a tricky part in the concerto without making any sound by:
    - F. moving her hand to various positions on the fingerboard.
    - G. sliding the bow lightly across the violin strings.
    - H. thinking through her part note by note in her head.
    - J. silently pretending to play the introduction on the piano.

Passage II

SOCIAL SCIENCE: This passage is adapted from the article "The Little Foxes" by Adele Conover (©2001 by Smithsonian Magazine).

Champagne-blond in the failing light, seven tiny animals engage in what looks like a game of touch football. Their big-eared parents, five-pound San Joaquin kit foxes, mark the playground's boundaries with an occasional sharp woof. I could be anywhere in the 8.5-million-acre San Joaquin Valley a century or so ago.

Reality intervenes. I am standing in a nondescript field, and that dark "cliff" in the background is an insurance company. I am in Bakersfield, California, in early April. This family of 9, along with 200 or so fellow San Joaquin kit foxes, shares this town with some 250,000 humans. Biologist Brian Cypher, who studies this unique urban subtribe for the San Joaquin Valley Endangered Species Recovery Program, notes that the human population is growing by 3,000 to 5,000 annually.

Although Cypher's tribe is safe for the moment, in order to ensure its long-term survival, he seeks the secret to its success. His data is being matched by the research of Katherine Ralls, a scientist with the Smithsonian's Conservation and Research Center, on a wilder kit fox population living just west of here, in the Carrizo Plain National Monument. The combined information will reveal much about genetics, behavior, distribution and population size that can be applied to the little carnivore's conservation. One of several subspecies of kit fox, and the only one that is listed federally as endangered, the San Joaquin kit fox is considered an umbrella species for this part of California: if it survives, then other threatened and endangered animals and plants that share its habitat will too.

Scientists estimate that the range-wide population of the San Joaquin kit fox prior to 1930 was 8,000 to 12,000; in 1975, about 7,000. The current population is unknown. Three "core" and several satellite populations exist in California, but they are widely separated.

The San Joaquin kit fox came to such dire straits—less than 5 percent of its original habitat remains—as a result of the usual suspects: agriculture, development, oil exploration and, more so in earlier days, "varmint control" poisoning and trapping.

In Bakersfield, says Cypher, the attitude toward the kit foxes is mixed. "Some are afraid of them. Some no doubt would like to shoot them. Some regard them as 'their' kit foxes, and if they see us trapping to put on ear tags and change [radio collar] batteries, they want us to stop."

Now, in a bow to the tiny fox's rare status, the city keeps a map of the known dens that may harbor kit foxes, says Cypher. In the early 1980s, however, the city's first conservation plan did not even mention the little foxes despite their 1967 federal endangered listing. "Negotiations took more than seven years until the Metropolitan Bakersfield Habitat Conservation Plan was approved in 1994," says Cypher.

Officially, no one paid much attention to urban kit foxes in Bakersfield until 1985, when Cal State biology professor Ted Murphy approached the Bakersfield city council about 440 acres of riverbed and floodplain that he hoped could be set aside to create a riparian studies area, in part as a way to protect the kit foxes that lived there. Murphy later used nine radio-collared kit foxes to document the peril that vehicles, expanding development, predators such as domestic dogs and even rodent poisons continued to pose for kit foxes in the city.

Now Cypher's study has investigated 220 dens in town. "Eighty-four percent were dug in dirt, 12 percent in structures created by human activity, and 4 percent in open fields that have so far escaped development," he says. Humans are everywhere. But the little foxes have two speeds, fast and faster, and sometimes they can avoid trouble with urban predators by squeezing into openings no larger than four inches across. The little foxes dig make-do dens under storage areas, and in school yards, storm-water drainage sumps, concrete rubble piles and pipes.

"Their urban life is a bonus," says Cypher. "Storm-water storage sumps are proving to be good habitat, and every time a new housing division comes along, builders have to put in a new sump—so unknowingly, developers are actually creating kit fox habitat."

For the most part, in the "real" world kit foxes escape their predators and the high temperatures of their desert environment by spending the day underground in a den. In Bakersfield, they follow suit. Kit foxes move every couple of weeks to a new den. Moving to different dens may be one reason why they have persisted—the constantly changing abodes provide new places to hide.

11. The main purpose of the passage is to:

- **A.** persuade Bakersfield residents to support Cypher's protection of San Joaquin kit foxes.
- **B.** inform readers about San Joaquin kit foxes and human influence on their habitat and populations.
- **C.** express the author's enjoyment of the sight of San Joaquin kit foxes playing and digging dens.
- **D.** explain why the San Joaquin kit foxes are endangered.

12. According to the passage, the main focus of Cypher's research on San Joaquin kit foxes is:

- **F.** determining the reason they became endangered.
- **G.** conducting genetic research to help them survive in an urban habitat.
- **H.** keeping them on the endangered species list.
- **J.** discovering the methods of adaptation they use for survival.

13. The statement "Reality intervenes" (line 8) is intended to signal a shift in the discussion of San Joaquin kit foxes from:

A. their natural instincts to recent behavior changes.
B. the physical characteristics of the young to those of adults.
C. the author's hopes for their future to current conservation projects.
D. the author's vision of their previous habitats to their current living conditions.

14. According to the passage, which of the following events happens first chronologically?

F. The San Joaquin kit foxes are placed on the federal endangered species list.
G. The Metropolitan Bakersfield Habitat Conservation Plan is approved.
H. Bakersfield creates a map of the dens where San Joaquin kit foxes may live.
J. Murphy approaches the Bakersfield city council with a research proposal.

15. The first paragraph describes the San Joaquin kit fox parents relating to their offspring by:

A. ignoring them while they play.
B. demonstrating how to play games.
C. signaling the limits of their play area.
D. barking to warn them of approaching predators.

16. The passage indicates that the term *umbrella species* (line 30) refers to species:

F. that may be threatened by the dry climate in Bakersfield.
G. whose survival means that other at-risk species in the habitat will also survive.
H. that are unique to California's microclimates.
J. whose best chance for survival is to inhabit congested urban areas.

17. If the sixth paragraph (lines 43–48) were deleted, the passage would primarily lose information about the Bakersfield community's:

A. procedures for registering concerns about Cypher's research techniques.
B. reactions to the San Joaquin kit foxes and to Cypher's research on them.
C. attempts to help Cypher with his research.
D. responses to Cypher when he asks to trap the San Joaquin kit foxes on city-owned land.

18. The passage does NOT mention Murphy determining that the San Joaquin kit fox was threatened by:

F. domestic dogs.
G. air pollution.
H. vehicles.
J. rodent poisons.

19. According to the passage, Cypher's investigation of San Joaquin kit fox dens in Bakersfield revealed that the vast majority of the dens had been:

A. dug in dirt.
B. built in human-made structures.
C. relocated from the city to open fields.
D. unaffected by human activity.

20. As it is used in line 83, the phrase *the "real" world* most nearly refers to:

F. the residential developments that are inevitably expanding into animal habitats.
G. the current living conditions for animals in urban environments.
H. an artificial environment used for research on animal behavior.
J. a natural habitat for animals that is unchanged by human activity.

Passage III

HUMANITIES: This passage is adapted from the article "Portrait of the Artist as an Immigrant: Ha Jin's Quintessentially Chinese-American Novel" by Ruth Franklin (©2007 by Washington Post.Newsweek Interactive Co. LLC).

It is a literary truism that writers ought to write in their native language. Ezra Pound, Paul Celan, Thomas Mann, Isaac Bashevis Singer, Czeslaw Milosz: They all spent much of their lives far from their homelands, but their work is inconceivable in any language other than its original. With few exceptions, writers who break this mold are met with incredulity. Creativity, so the mythology goes, can spring only from an original source.

The work of Ha Jin, who has lived in the United States for more than 20 years and now teaches creative writing at Boston University, has been greeted with similar wonderment. With the publication of *A Free Life*, his fifth novel (there have also been three books of poetry and two of short stories), he is still fielding the perennial question: Why does he choose to write in English?

A Free Life—Jin's most personal novel, though not exactly autobiographical—confronts the taboo head on. This meandering yet deeply affecting novel is at once a version of the classic saga of an immigrant family adjusting to life in the United States and a highly unconventional portrait of the artist as an immigrant, family man, and all-around ordinary guy. While Jin has always been polite to his interviewers, it seems quite clear that Nan Wu, the poet who is the protagonist of *A Free Life*, speaks for his creator in response to a magazine editor who asks, "Can you imagine your work becoming part of our language?" Nan bristles: "I have no answer to that xenophobic question, which ignores the fact that the vitality of English has partly resulted from its ability to assimilate all kinds of alien energies."

In a relaxed narrative, *A Free Life* follows Nan over the course of a double journey: his quest to provide his family with financial stability while simultaneously realizing his dream of becoming a poet. He starts off working odd jobs, but soon he and his wife, Pingping, have saved up enough money to buy a Chinese restaurant and a house of their own. By all the benchmarks of the American dream, they are successful. But Nan worries that the banality of his daily existence is stifling him as a writer. "Do you have to live a literary life to produce literary work?" he asks a poet friend. By closely tracking every step of Nan's creative genesis, Jin's novel offers an alternative vision of imaginative growth inspired precisely by the most mundane circumstances.

Ha Jin has said that he sees himself as a Chinese-American writer: "I need the hyphen." *A Free Life* is the quintessential Chinese-American book, in which the dilemma of how to exist simultaneously in two worlds—on both sides of that hyphen—animates every page. Like the famously four-toned Chinese dialect of Mandarin, the novel takes place in multiple registers. First there is the dominant narrative voice, at times fluid and evocative, but also idiosyncratic and clunky. Though it is disguised as a conventional third-person narrator, this is Nan's literary voice struggling to find its way in English. Sometimes he overdoes the literary effects, as when he describes a Chinese restaurant as "glazed entirely with mirror, on which some sea creatures were blazoned." And sometimes he overshoots in search of the right word or drops in a jarring colloquialism. This is the work of a man who speaks English as if he had learned it from the dictionary—and indeed, we often glimpse Nan studying his dictionary during lulls on the job.

Nan's literary voice contrasts dramatically with his heavily accented speech, a device that works to emphasize the gap between Nan's fluent thoughts and his speech: Though he will come close to mastering English in his head, he will never sound fully competent to others.

Somewhat less convincing is Jin's other major stylistic choice. While his other works have been rigorously structured, *A Free Life* is loose and baggy, with episodes that lead down dead ends and digressions that amount to little. The Wus' life is full of dramatic events, but they are presented in a tone of almost comical understatement. This artlessness feels intentional, an approximation of how a talented but unschooled writer like Nan might tell his own story.

It is a testimony to Jin's abilities that the novel manages to be engrossing despite its total disregard for narrative tension. The charm of *A Free Life* comes from its cheerful subversiveness, its gentle upending of the most persistent myths about the creation of art.

21. According to the passage, which of the following does Jin have in common with the writers listed in lines 2–3?

- **A.** He has written a number of novels in English.
- **B.** The majority of his novels are set in his homeland.
- **C.** His writing has often been met with incredulity.
- **D.** He has spent many years away from his homeland.

22. According to the passage's author, Nan's response to a magazine editor's question mainly represents:

- **F.** Nan's quest to provide his family with economic security.
- **G.** Jin's own frequent, angry outbursts during interviews with magazine editors.
- **H.** Jin's own feelings about his work and its relationship to the English language.
- **J.** Nan's distrust of the magazine editors who publish his poems.

23. The main purpose of the fourth paragraph (lines 34–48) is to:

A. provide a brief summary of *A Free Life* and introduce one of the novel's themes.
B. describe *A Free Life*'s main characters and explain why they immigrated to the United States.
C. question some of Jin's plot choices and suggest ways in which *A Free Life* could have been improved.
D. examine the ways in which *A Free Life* criticizes the concept of the American dream.

24. In the passage, the phrase "writers who break this mold" (lines 6–7) refers to writers who write:

F. about nonnative English speakers.
G. about their experiences as immigrants.
H. in their native language.
J. in a language other than their native one.

25. Based on the passage, *A Free Life* most strongly supports which of the following about a writer's development?

A. A writer should write poetry before attempting to write a novel.
B. The most mundane circumstances can inspire a writer's creative growth.
C. An inexperienced writer should avoid challenging persistent myths about writing.
D. It's necessary to lead a literary life in order to become a good writer.

26. Based on the passage, Jin's statement "I need the hyphen" (line 50) most nearly means that he:

F. considers himself a part of both Chinese and American cultures.
G. has a strong desire to return to his homeland of China.
H. is unsure of his decision to write *A Free Life* in English rather than Chinese.
J. hesitates to refer to *A Free Life* as both a Chinese and an American book.

27. The passage indicates that *A Free Life*'s dominant narrative voice is at times "idiosyncratic and clunky" (line 57) because:

A. Jin has had little experience writing conventional third-person narration.
B. *A Free Life* was one of Jin's earliest attempts at writing a novel in English.
C. the narrative voice represents Nan's struggle to relate to his wife and family.
D. the narrative voice represents Nan's struggle to develop his literary voice in English.

28. Which of the following does the passage's author cite as evidence that Nan occasionally overdoes literary effects?

F. The fact that *A Free Life* tracks Nan's progress as an artist
G. The fact that *A Free Life* has a dominant narrative voice
H. Nan's description of a Chinese restaurant
J. Nan's jarring colloquialisms

29. According to the passage, compared to Jin's other novels, *A Free Life* is:

A. more conventional.
B. more poetic.
C. less personal.
D. less structured.

30. Another reviewer made the following observation about Jin's approach to storytelling in *A Free Life*:

> Ha Jin jolts the Wus and their neighbors with personal tragedies. Like the great joys in their lives, these are quickly glossed over.

Compared to this reviewer's observation, the passage's description of Jin's approach to storytelling in *A Free Life* can best be described as:

F. similar, because the passage's author considers the novel's descriptions of dramatic events to be understated.
G. similar, because the passage's author considers the novel to be primarily a tragedy.
H. dissimilar, because the passage's author believes the novel disregards narrative tension.
J. dissimilar, because the passage's author thinks Jin's descriptions of joyous events are highly emotional.

Passage IV

NATURAL SCIENCE: This passage is adapted from the article "Forests of the Tide" by Kennedy Warne (©2007 by National Geographic Society).

Mangroves live life on the edge. With one foot on land and one in the sea, these botanical amphibians occupy a zone of desiccating heat, choking mud, and salt levels that would kill an ordinary plant within hours. Yet the forests mangroves form are among the most productive and biologically complex ecosystems on Earth. Birds roost in the canopy, shellfish attach themselves to the roots, and snakes and crocodiles come to hunt. Mangroves provide nursery grounds for fish; a food source for monkeys, deer, tree-climbing crabs, even kangaroos; and a nectar source for bats and honeybees.

As a group, mangroves can't be defined too closely. There are some 70 species from two dozen families—among them palm, hibiscus, holly, plumbago, and legumes. They range from prostrate shrubs to 200-foot-high timber trees. Though most prolific in Southeast Asia, where they are thought to have originated, mangroves circle the globe. Most live within 30 degrees of the Equator, but a few hardy types have adapted to temperate climates, and one lives as far from the tropical sun as New Zealand. Wherever they live, they share one thing in common: They're brilliant adapters. Each mangrove has an ultrafiltration system to keep much of the salt out and a complex root system that allows it to survive in the intertidal zone. Some have snorkel-like roots called pneumatophores that stick out of the mud to help them take in air; others use prop roots or buttresses to keep their trunks upright in the soft sediments at the tide's edge.

These plants are also landbuilders par excellence. The plants' interlocking roots stop riverborne sediments from coursing out to sea, and their trunks and branches serve as a palisade that diminishes the erosive power of waves.

Bangladesh has not lost sight of that logic, putting a great premium on the ability of mangroves to stabilize shores and trap sediments. A low-lying country with a long, vulnerable coastline, Bangladesh is also land starved, with a population density of 2,500 persons per square mile. By planting mangroves on delta sediments washed down from the Himalaya, it has gained over 300,000 acres of new land on the Bay of Bengal. The plantings are relatively new, but there have been mangroves here for as long as the Ganges, Brahmaputra, and Meghna Rivers have been draining into the bay. The vast tidal woodland they form is known as the Sundarbans—literally "beautiful forest." Today, it is the largest single tract of mangroves in the world.

For more than 25 years Jin Eong Ong, a retired professor of marine and coastal studies in Penang, Malaysia, has been exploring a less obvious mangrove contribution: What role might these forests play in climate change? Ong and his colleagues have been studying the carbon budget of mangroves—the balance sheet that compares all the carbon inputs and outputs of the mangrove ecosystem—and they've found that these forests are highly effective carbon sinks. They absorb carbon dioxide, taking carbon out of circulation and reducing the amount of excess greenhouse gas in the atmosphere.

By measuring photosynthesis, sap flow, and other processes in the leaves of the forest canopy, Ong and his team can tell how much carbon is assimilated into mangrove leaves, how much is stored in living trees, and how much eventually makes its way into nearby waterways. The measurements suggest that mangroves may have the highest net processing of carbon of any natural ecosystem (about a hundred pounds per acre per day) and that as much as a third of this may be exported in the form of organic compounds to mudflats. Mangroves, it seems, are carbon factories, and their demolition robs the marine environment of a vital element.

Ong's team has also shown that a significant portion of the carbon ends up in forest sediments, remaining sequestered there for thousands of years. Conversion of a mangrove forest to a shrimp pond changes a carbon sink into a carbon source, liberating the accumulated carbon back into the atmosphere—but 50 times faster than it was sequestered.

If mangroves were to become recognized as carbon-storage assets, that could radically alter the way these forests are valued, says Ong.

"Take Indonesia, which has the largest total area of mangroves of any country in the world. It can't afford to save them for nothing," Ong says. "But if the Indonesians could trade the carbon-storage potential of their mangroves as a commodity, that would create a great incentive to stop bulldozing them for shrimp ponds or chipping them for the production of rayon."

31. The passage refers to the role mangrove forests play in climate change as "less obvious" (line 52) most likely because:

- **A.** the Sundarbans haven't been around long enough to have had a measurable effect on the climate.
- **B.** Ong's mangrove research in Malaysia hasn't received as much attention as his research in Bangladesh.
- **C.** the mangrove's impact on climate change isn't as readily apparent as the impact it has had on Bangladesh's shoreline.
- **D.** deforestation has hindered Ong's attempts to study the mangrove's impact on climate change.

32. One main purpose of the second paragraph (lines 13–30) is to:

F. compare mangrove trunks and root systems with those of other marine plants.
G. indicate that mangrove species vary in their physical characteristics and global distribution.
H. describe the typical weather and tidal conditions in areas where most mangroves grow.
J. speculate about when mangroves were first grown in New Zealand.

33. In the context of the passage, the main purpose of lines 36–43 is to:

A. describe the impact human overpopulation has had on mangrove forests.
B. illustrate a claim made in the preceding paragraph about an attribute of mangroves.
C. describe the challenges humans face when planting and growing mangroves.
D. introduce the discussion in the fifth paragraph (lines 50–61) of efforts to preserve mangrove forests.

34. According to the passage, the conversion of mangrove forests to shrimp ponds results in:

F. an excessive buildup of delta sediments.
G. a slightly more efficient system for storing carbon.
H. an increase in the amount of carbon processed by other types of plants.
J. a release of carbon that had previously been trapped in forest sediments.

35. According to Ong, as he is presented in the passage, a country might be more inclined to preserve its mangrove forests if the country were:

A. able to trade the carbon-storage potential of its mangroves as a commodity.
B. given access to more coastal land for building homes and businesses.
C. provided with substantial proof that shrimp ponds harm the environment.
D. recognized for its other efforts to reduce excess greenhouse gases in the atmosphere.

36. Which of the following statements about mangroves is best supported by the passage?

F. They provide both food and shelter for a wide variety of animals.
G. They use pneumatophores to help keep their trunks upright in soft sediments.
H. They are nearing extinction in Indonesia.
J. They are thought to have originated in New Zealand.

37. According to the passage, where do most mangroves grow?

A. Malaysia
B. New Zealand
C. Temperate climates
D. Within 30 degrees of the Equator

38. According to the passage, which of the following is a characteristic of all mangroves?

F. They have a salt-filtration system.
G. They have snorkel-like roots.
H. They have prop roots.
J. They can grow up to 200 feet high.

39. According to the passage, Ong's study of mangroves suggests that mangrove forests:

A. process more carbon than does any other natural ecosystem.
B. grow better in coastal areas with carbon-rich soils.
C. provide protection against the erosive power of waves.
D. take in air through specialized roots that stick out of the mud.

40. According to the passage, mangroves process about how much carbon per day?

F. One hundred pounds per mangrove
G. One hundred pounds per acre of mangrove forest
H. One-third of the amount of carbon found in the surrounding mudflats
J. One-third of the amount of carbon present in the atmosphere

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

DIRECTIONS: There are seven passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

Passage I

Scientists categorized each of the 300 pearly mussel species native to North America. If there were sufficient data to determine a species' risk of extinction, it was placed in 1 of 5 risk categories; otherwise, it was placed in a separate category (see Table 1).

Table 1

Category		Percent of species
increasing risk of extinction →	Extinct	7
	Endangered	26
	Special concern	24
	Threatened	15
	Stable	24
Insufficient data		4

Table 1 adapted from Upper Midwest Environmental Sciences Center, "Development of Landscape Models for Conservation of Freshwater Mussels in the Upper Mississippi River Basin." U.S. Geological Survey, 2003.

Zebra mussels (a nonnative species) are thought to damage pearly mussel populations in North America. Zebra mussels became abundant in the Hudson River estuary in late 1992. Figure 1 shows the number of native pearly mussels in the Hudson River estuary late in each year from 1992 through 2002.

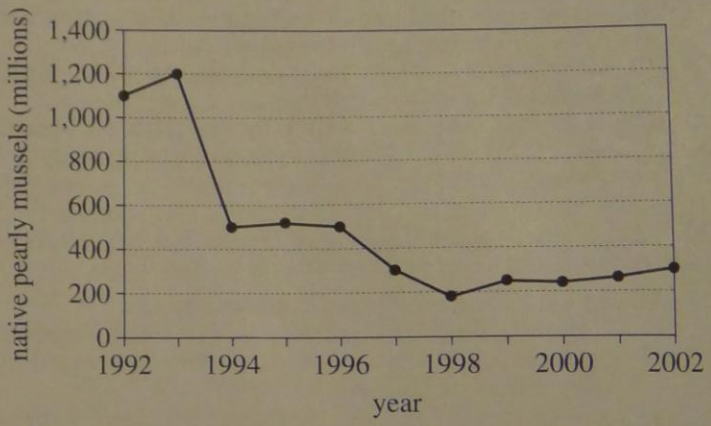


Figure 1

Figure 1 adapted from David Strayer, "Pearly mussels are well worth closer inspection." ©2004 by Poughkeepsie Journal.

1. According to Table 1, what percent of the pearly mussel species native to North America could not be placed in a category based on their risk of extinction?
   - **A.** 0%
   - **B.** 4%
   - **C.** 7%
   - **D.** 24%

2. Based on Figure 1, how many pearly mussels were most likely present in the Hudson River estuary when zebra mussels became abundant there?

   F. Less than 1,000 million
   G. Between 1,000 million and 1,200 million
   H. Between 1,200 million and 1,400 million
   J. More than 1,400 million

3. Based on Table 1, what percent of the pearly mussel species native to North America were the scientists able to place in a risk category but did not classify as extinct or stable?

   A. 7%
   B. 26%
   C. 50%
   D. 65%

4. Assume that zebra mussels *do* damage pearly mussel species native to North America. Based on Figure 1, if all the zebra mussels in the Hudson River estuary had been removed in 2002, the population of native pearly mussels in the estuary in 2005 most likely would have been:

   F. less than or equal to 25 million.
   G. between 25 million and 125 million.
   H. between 125 million and 225 million.
   J. greater than or equal to 225 million.

5. Which of the mussels, the zebra mussels or the pearly mussels, if either, would, when encountered in the Hudson River estuary, be considered an invasive species?

   A. Zebra mussels only
   B. Pearly mussels only
   C. Both zebra mussels and pearly mussels
   D. Neither zebra mussels nor pearly mussels

Passage II

Physics students studied electrical current and resistance using the electrical circuit shown in Figure 1 below.

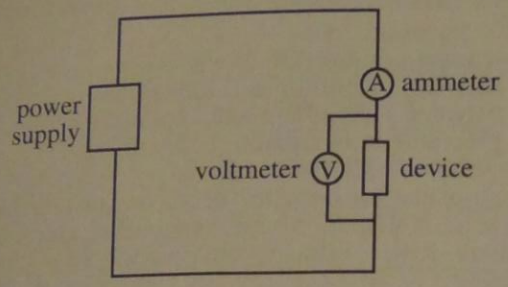


Figure 1

The students determined the electrical current, I, flowing through each of 3 devices—a resistor, a lightbulb, and a diode—for various voltages, $\mathscr{E}$, across the device. At each voltage, the students also determined the resistance, R, of each device.

Figure 2 shows graphs of I, in milliamperes (mA), versus $\mathscr{E}$, in volts (V), for each device. Figure 3 shows graphs of R, in ohms (Ω), versus $\mathscr{E}$ for each device.

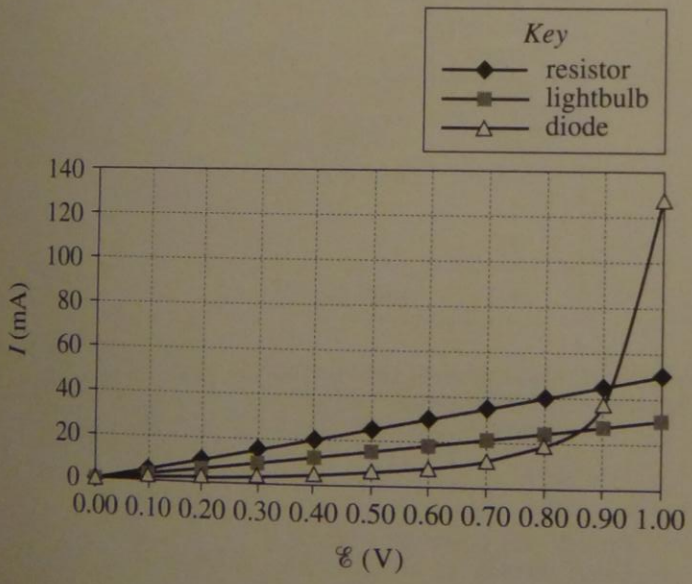


Figure 2

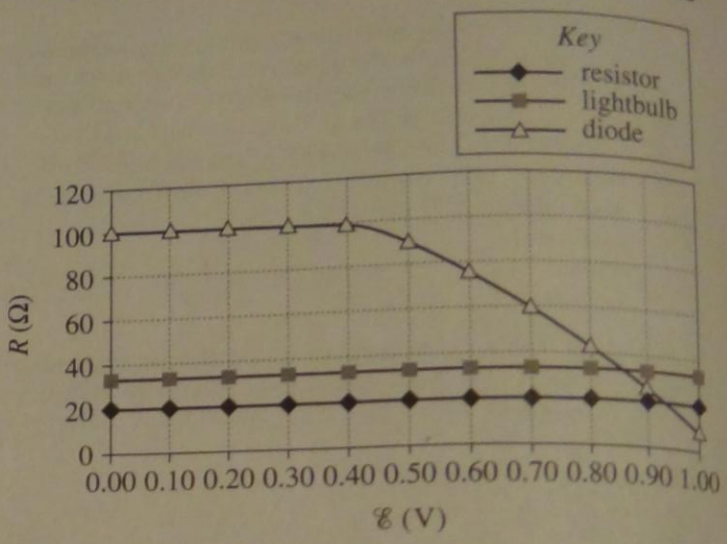


Figure 3

6. Based on Figure 2, at 1.10 V, I for the diode would most likely be:

   F. less than 20 mA.
   G. between 20 mA and 80 mA.
   H. between 80 mA and 130 mA.
   J. greater than 130 mA.

7. For each of the devices tested, as $\mathscr{E}$ increased, I:

   A. increased only.
   B. decreased only.
   C. varied, but with no general trend.
   D. remained the same.

8. For a device in an electrical circuit that follows *Ohm's law*, the ratio of the voltage across the device to the current flowing through the device is constant. Based on Figure 2, which of the 3 devices followed Ohm's law throughout the interval from $\mathscr{E} = 0.00$ V to $\mathscr{E} = 1.00$ V ?

   F. Resistor only
   G. Diode only
   H. Resistor and lightbulb only
   J. Lightbulb and diode only

9. Based on Figures 2 and 3, when R for the diode equaled 60 Ω, I for the diode was closest to which of the following?

   A. 12 mA
   B. 20 mA
   C. 38 mA
   D. 50 mA

10. Based on Figure 3, the diode best *conducted* electricity when $\mathscr{E}$ for the diode equaled which of the following?

    F. 0.20 V
    G. 0.40 V
    H. 0.60 V
    J. 0.80 V

Passage III

Suppose a ball is dropped from a height H above a horizontal surface. The ball falls straight down until it collides with the surface; then it bounces straight up, attaining a maximum height y before it begins to fall again. The *coefficient of restitution*, C, for the collision equals $\frac{y}{H}$.

Therefore:

$$y = CH$$

Physics students went to a high-altitude laboratory to conduct studies of C for various balls bouncing off different horizontal surfaces. The air temperature and air pressure were constant in the laboratory throughout the studies.

Study 1

The students dropped a racquetball from various H onto a particular horizontal surface, and after each drop they measured y. Then they graphed y versus H (see Figure 1); C equaled the slope of the graph.

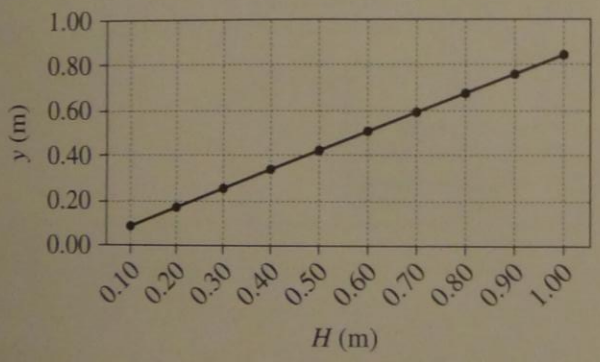


Figure 1

Study 2

The students repeated the procedure in Study 1 and determined C for various balls dropped onto both a bare concrete surface and a concrete surface covered with a thin layer of foam. Both surfaces were horizontal. The results are given in Table 1.

Table 1

Ball	C for ball's collision with: bare concrete surface	C for ball's collision with: foam-covered concrete surface
Racquetball	0.85	0.76
Golf ball	0.82	0.79
Tennis ball	0.75	0.66
Steel ball	0.65	0.42
Baseball	0.55	0.33

11. Suppose that, in an additional trial in Study 1, H had equaled 0.75 m. Based on the results of the study, y would have been closest to which of the following values?

A. 0.45 m
B. 0.55 m
C. 0.65 m
D. 0.75 m

12. Suppose, while testing a particular ball during Study 2, the students had obtained a value for C that was greater than 1.0. Which of the following statements would best explain this result?

F. The ball was not spherical in shape.
G. The ball broke upon impact.
H. The ball was thrown downward rather than dropped.
J. The ball stuck to the surface upon impact rather than bouncing upon impact.

13. Suppose, in an additional trial in Study 2, the students had dropped a ball onto the bare concrete surface, and the ball stuck to the surface without bouncing. C for this collision would have equaled what value?

A. 0.0
B. 0.5
C. 1.0
D. Cannot be determined from the given information

14. To determine if the surface tested in Study 1 was more likely bare concrete or foam-covered concrete, one would compare C in Study 1 with each C in Study 2 for the:

F. racquetball.
G. golf ball.
H. tennis ball.
J. baseball.

15. Suppose that in Study 2 the steel ball had been dropped onto the bare concrete surface and the foam-covered concrete surface from a height of 2.00 m. Approximately how much lower or higher would the steel ball have bounced after its collision with the bare concrete surface than after its collision with the foam-covered concrete surface?

A. 0.5 m lower
B. 1.0 m lower
C. 0.5 m higher
D. 1.0 m higher

16. Which of the following statements best explains why the students conducted the studies at the location referred to in the passage? The students most likely wanted to:

F. decrease the force exerted by gravity on the balls tested.
G. decrease the force exerted by air resistance on the balls tested.
H. increase the force exerted by gravity on the balls tested.
J. increase the force exerted by air resistance on the balls tested.

GO ON TO THE NEXT PAGE.

Passage IV

A researcher investigated the growth of 6 species of floodplain plants. Each species was classified as either flood-sensitive (S) or flood-tolerant (T) (see Table 1).

Table 1		
Plant species	Abbreviation	Classification
Achillea ptarmica	Ap	T
Achillea millefolium	Am	S
Festuca arundinacea	Fa	T
Festuca rubra	Fr	S
Rumex palustris	Rp	T
Rumex thyrsiflorus	Rt	S

Experiment

Seeds from each of the 6 species were germinated in a growth chamber maintained at 25.5°C during the day and at 10°C at night.

After germination, the seedlings of each species were planted in separate 0.5 L pots and grown for 4 weeks. The seedlings were watered 3 times per week.

At the end of the 4 weeks, each plant was repotted into its own 4 L pot containing a substrate composed of a 4:1 mixture, by mass, of sand to compost. The plants were grown for 2 more weeks; during this time, they were watered 3 times per week.

Next, the potted plants were placed in plastic tubs such that each tub contained 8 plants of each species. Each tub of plants was subjected to a different treatment (see Table 2) for 3 weeks.

Table 2	
Treatment	Procedure
1	Pots were watered 3 times per week. Water level was always below the substrate surface.
2	Water level was maintained at the substrate surface.
3	Water level was maintained 2 cm above the substrate surface.
4	Water level was maintained 6 cm above the substrate surface.

At the end of the 3-week treatments, the plants were harvested, and their roots were washed. The roots were separated from the shoots, and then both were dried at 70°C for 48 hr. The average dry shoot biomass per plant and the average dry root biomass per plant were determined for each species and treatment combination (see Figures 1 and 2, respectively).

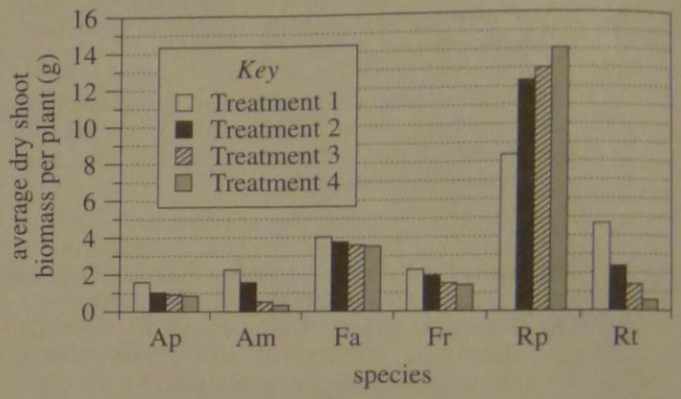


Figure 1

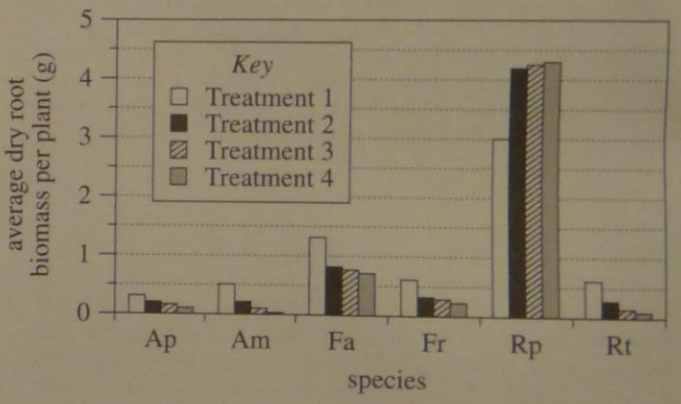


Figure 2

Figures 1 and 2 adapted from C. Jansen, H. M. Van De Steeg, and H. De Kroon, "Investigating a Trade-Off in Root Morphological Responses to a Heterogeneous Nutrient Supply and to Flooding." ©2005 by British Ecological Society.

17. Which treatment resulted in the greatest average dry shoot biomass per plant for Rp plants?

A. Treatment 1
B. Treatment 2
C. Treatment 3
D. Treatment 4

18. The roots were washed after harvest most likely to ensure that the:

F. roots had an opportunity to sprout after the plants were repotted.
G. intracellular water could be removed from the shoot biomass during the drying process.
H. substrate particles attached to the roots were not included in the root biomass measurements.
J. shoots were removed from the plants prior to the drying process.

19. When the water level was maintained 2 cm above the substrate surface, which floodplain plants, the T species plants or the S species plants, had the greater average dry root biomass per plant?

A. The T species plants; the average dry root mass per plant was greater for Ap plants than for Am plants, greater for Fa plants than for Fr plants, and greater for Rp plants than for Rt plants.
B. The T species plants; the average dry root mass per plant was greater for Am plants than for Ap plants, greater for Fr plants than for Fa plants, and greater for Rt plants than for Rp plants.
C. The S species plants; the average dry root mass per plant was greater for Ap plants than for Am plants, greater for Fa plants than for Fr plants, and greater for Rp plants than for Rt plants.
D. The S species plants; the average dry root mass per plant was greater for Am plants than for Ap plants, greater for Fr plants than for Fa plants, and greater for Rt plants than for Rp plants.

20. Which of the following pieces of equipment was most likely used to collect the data presented in Figure 1 ?

F. Microscope
G. Balance
H. Hydrometer
J. Ruler

21. Which of the following comparisons of the shoot biomass and the root biomass produced by S and T floodplain plants is best supported by the results of the experiment? Regardless of the water level:

A. both S and T plants produce, on average, more shoot than root biomass per plant.
B. both S and T plants produce, on average, more root than shoot biomass per plant.
C. S plants produce, on average, more shoot than root biomass per plant, whereas T plants produce, on average, more root than shoot biomass per plant.
D. S plants produce, on average, more root than shoot biomass per plant, whereas T plants produce, on average, more shoot than root biomass per plant.

22. The plants investigated in the experiment were from how many different genuses?

F. 2
G. 3
H. 4
J. 6

Passage V

Students were given unknown aqueous acid solutions UAX, UAY, and UAZ. Each solution had an acid concentration of 0.100 mole/L but contained a different acid. The students were also given Table 1, which gives the pK_a of each of 5 acids (the lower the pK_a, the stronger the acid).

Table 1

Acid	pK_a
Pyruvic	2.5
Chloroacetic	2.9
Iodoacetic	3.2
Formic	3.7
Acetic	4.8

In a *titration*, the *titrant* (a solution of known identity and concentration) is slowly added to the *analyte* (a solution of unknown identity or concentration). Students used titration to attempt to identify the acid present in UAX, UAY, and UAZ.

Experiment 1

A 0.100 mole/L aqueous sodium hydroxide (NaOH, a base) solution was added to a *buret* (a graduated tube with a valve at the bottom that can be opened to dispense precise volumes of liquid). The initial volume of solution in the buret was recorded. A beaker containing 20.00 mL of UAX was placed under the buret. A pH probe was placed in the beaker. Then 25.00 mL of the NaOH solution was added in small increments to the acid solution while the acid solution was continuously stirred. After each addition, the pH of the solution in the beaker was recorded (see Figure 1).

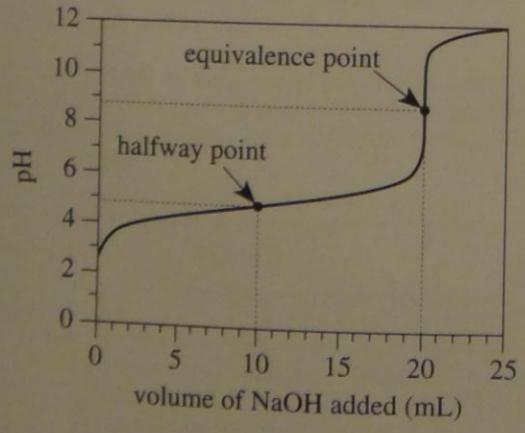


Figure 1

In Figure 1, the *equivalence point* indicates the volume of NaOH solution needed to react with all the acid in the solution in the beaker. At the *halfway point*, the volume of NaOH solution added is half of the volume needed to reach the equivalence point, and the pH of the solution in the beaker equals the pK_a of the acid in the solution.

Experiment 2

The procedure from Experiment 1 was repeated with UAY instead of UAX (see Figure 2).

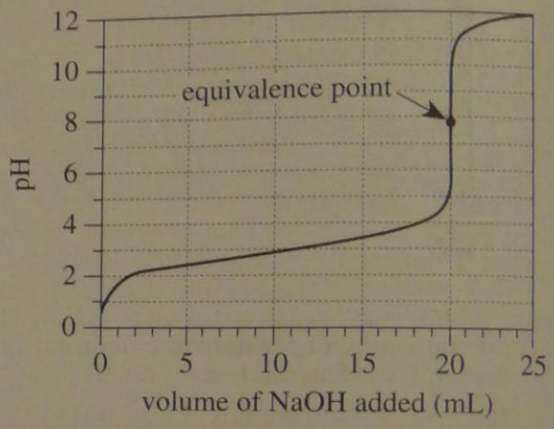


Figure 2

Experiment 3

The procedure from Experiment 1 was repeated with UAZ instead of UAX (see Figure 3).

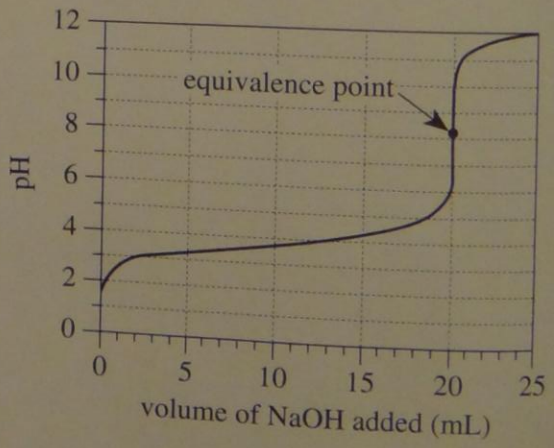
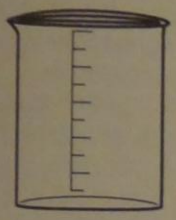


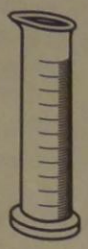
Figure 3

23. Based on the description of Experiment 1, which of the following diagrams best shows the apparatus that was used to dispense the titrant?

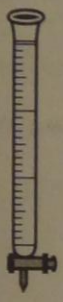
A.



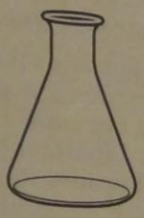
C.



B.



D.



24. Which of the following statements describes a difference between Experiments 1 and 3 ?

F. In Experiment 1, the analyte was stirred; in Experiment 3, the analyte was not stirred.
G. In Experiment 1, the titrant was stirred; in Experiment 3, the titrant was not stirred.
H. The analyte in Experiment 1 was different from the analyte in Experiment 3.
J. The titrant in Experiment 1 was different from the titrant in Experiment 3.

25. *Hydrazoic acid* is a weaker acid than is formic acid but is a stronger acid than is acetic acid. Based on Table 1, the pK_a of hydrazoic acid is:

A. less than 3.2.
B. between 3.2 and 3.7.
C. between 3.7 and 4.8.
D. greater than 4.8.

26. In Experiment 2, the solution in the beaker was neutral when the volume of NaOH added was at a value between:

F. 9 mL and 11 mL.
G. 13 mL and 15 mL.
H. 15 mL and 17 mL.
J. 19 mL and 21 mL.

27. A student claimed that the acid in UAX is pyruvic acid. Based on Table 1 and Figure 1, this claim is *incorrect* because the pK_a of pyruvic acid is:

A. less than was the pH at the equivalence point.
B. greater than was the pH at the equivalence point.
C. less than was the pH at the halfway point.
D. greater than was the pH at the halfway point.

28. Suppose Experiment 3 is repeated, but the concentration of the NaOH solution is 0.200 mole/L. Will the volume of NaOH added at the halfway point and at the equivalence point be less than, greater than, or equal to the corresponding results shown in Figure 3 ?

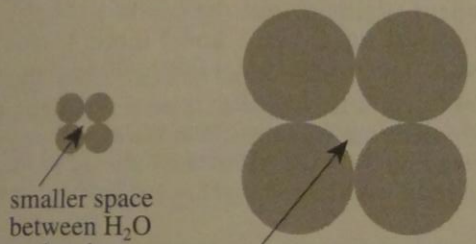
	halfway point	equivalence point
F.	less	less
G.	greater	less
H.	greater	greater
J.	equal	equal

Passage VI

A teacher showed 2 beakers to a chemistry class. One beaker contained mineral oil and the other contained H_2O. Solid iodine was added to each beaker. The solid iodine quickly dissolved in the mineral oil, which turned pink. The solid stayed at the bottom of the H_2O, which remained colorless. The teacher asked 3 students to explain these results.

Student 1

Mineral oil is made up of very large molecules, while H_2O is made up of very small molecules. Thus, the spaces between mineral oil molecules are much larger than the spaces between H_2O molecules (see figure).



For a solid to dissolve in a solvent, its molecules must squeeze in between solvent molecules. The *molecular mass* (the mass of 1 molecule in atomic mass units, amu) of a substance is a good indicator of molecular size, so if a solid has a molecular mass less than that of a solvent, it will most likely dissolve in the solvent. Therefore, the iodine dissolved in the mineral oil, but not in the H_2O.

Student 2

An H_2O molecule is *polar* because it has a region of positive charge and a region of negative charge. *Nonpolar* molecules, like those that make up mineral oil, do not have differently charged regions. Polar molecules are attracted to each other, and nonpolar molecules are attracted to each other, but polar molecules repel nonpolar molecules. Thus, polar solids dissolve in polar solvents, and nonpolar solids dissolve in nonpolar solvents. Therefore, the iodine dissolved in the mineral oil, but not in the H_2O. Molecular size is unrelated to solubility.

Student 3

Student 2 is correct, but with one exception. Nonpolar molecules are actually strongly attracted to polar molecules. The reason that nonpolar substances don't dissolve in polar substances is that polar molecules are too strongly attracted to each other to allow nonpolar molecules to come between them. If a drop of mineral oil is placed on the surface of a pan full of H_2O, the drop will spread to form the thinnest layer possible in order to maximize contact with H_2O molecules.

29. Which of the following terms best describes the mixture of iodine and solvent in each of the beakers at the end of the teacher's demonstration?

	iodine and mineral oil	iodine and H_2O
A.	heterogeneous	heterogeneous
B.	heterogeneous	homogeneous
C.	homogeneous	heterogeneous
D.	homogeneous	homogeneous

30. Based on Student 1's explanation, is it likely that solid H_2O would be soluble in mineral oil?

F. Yes, because the solute molecules and the solvent molecules are nonpolar.
G. Yes, because H_2O molecules are much smaller than mineral oil molecules.
H. No, because the solute molecules are polar and the solvent molecules are nonpolar.
J. No, because H_2O molecules are much larger than mineral oil molecules.

31. How would Student 1 most likely rank the 3 substances used in the demonstration, from the substance with the smallest molecular mass to the substance with the largest molecular mass?

A. Iodine < H_2O < mineral oil
B. H_2O < iodine < mineral oil
C. Mineral oil < iodine < H_2O
D. Mineral oil < H_2O < iodine

32. In Student 2's explanation, the sentence "Therefore, the iodine dissolved in the mineral oil, but not in the H_2O" implied that iodine molecules are:

F. nonpolar.
G. polar.
H. smaller than H_2O molecules.
J. larger than H_2O molecules.

33. Suppose it were observed that mineral oil molecules were smaller than iodine molecules. What impact, if any, would this observation have on Student 3's explanation?

A. It would prove that the explanation is correct.
B. It would support the explanation, but not prove that the explanation is correct.
C. It would weaken the explanation, but not prove that the explanation is incorrect.
D. It would have no impact on the explanation.

34. Paraffin wax is a nonpolar solid and acetic acid is a polar solvent. Based on Student 3's explanation, would paraffin wax be soluble in acetic acid?

F. Yes, because the paraffin wax molecules would be strongly attracted to the acetic acid molecules.
G. Yes, because the paraffin wax molecules would be more attracted to each other than to the acetic acid molecules.
H. No, because the paraffin wax molecules would be repelled by the acetic acid molecules.
J. No, because the acetic acid molecules would be more attracted to each other than to the paraffin wax molecules.

35. The nonpolar solid 9,10-diphenylanthracene has a molecular mass of 330 amu and readily dissolves in benzene. Benzene is a nonpolar solvent with a molecular mass of 78 amu. These observations are *inconsistent* with the explanation(s) put forth by:

A. Student 1 only.
B. Student 2 only.
C. Student 1 and Student 2 only.
D. Student 2 and Student 3 only.

GO ON TO THE NEXT PAGE.

Passage VII

Radar observations of Saturn's moon Titan have revealed landforms that resemble longitudinal sand dunes found in some deserts on Earth. Such dunes are produced when sand-size solid particles are deposited in linear, parallel piles (see Figure 1). Figure 2 shows the average dune spacing and average dune height for each of a number of areas of dunes on Titan and in 4 deserts on Earth (Deserts A–D). Figure 3 shows plots of the *surface elevation* (elevation above a horizontal reference plane) across a 25 km wide perpendicular cross section of dunes on Titan and in Desert A.

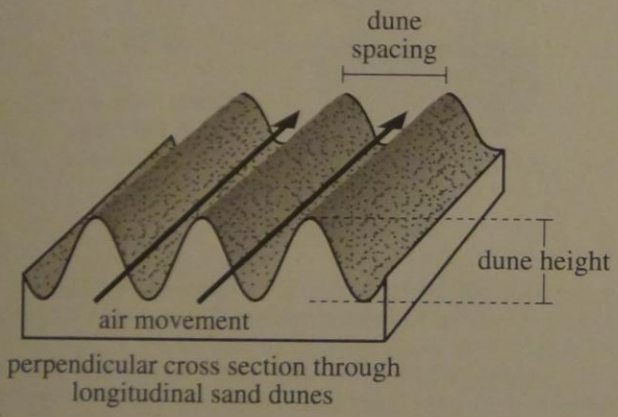
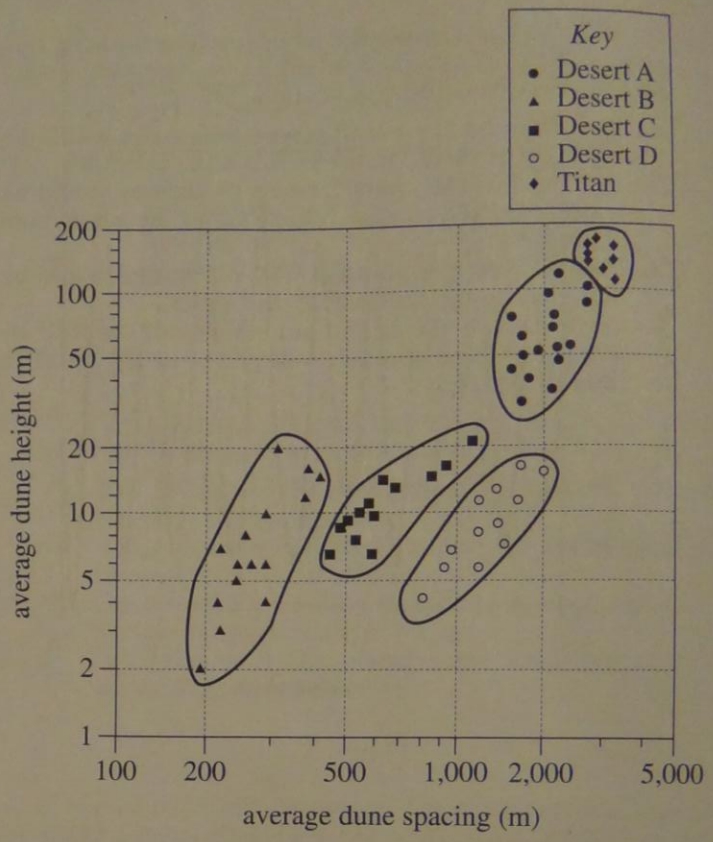


Figure 1



Note: Each symbol on the graph represents data for a different area of dunes in a desert or on Titan.

Figure 2

Figure 2 adapted from Nicholas Lancaster, "Linear Dunes on Titan." ©2006 by the American Association for the Advancement of Science.

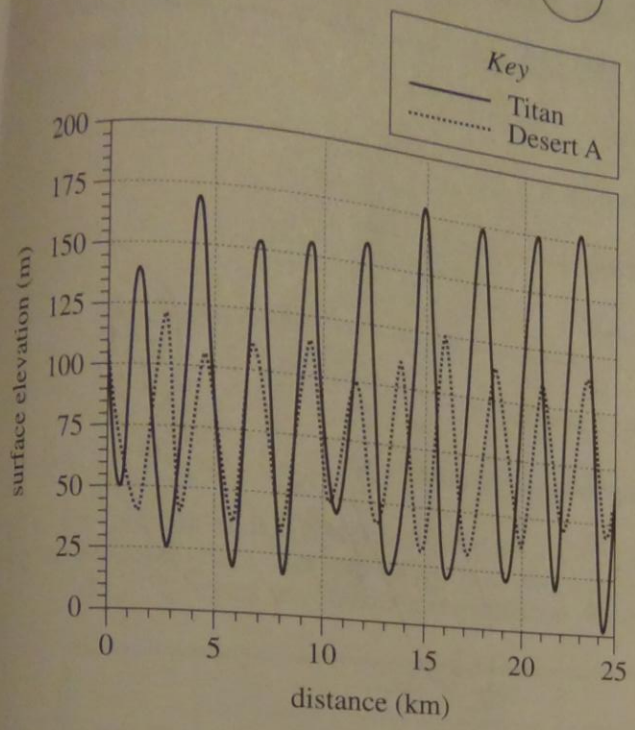


Figure 3

Figure 3 adapted from R. D. Lorenz et al., "The Sand Seas of Titan: Cassini RADAR Observations of Longitudinal Dunes." ©2006 by the American Association for the Advancement of Science.

36. According to Figure 2, which of the following average dune spacings and average dune heights would be most likely for an area of Desert D dunes?

	dune spacing (m)	dune height (m)
F.	500	2
G.	500	7
H.	1,000	2
J.	1,000	7

37. Assume that for the dunes represented in Figure 2, as average wind speed increases, average dune height increases. Did Desert A or Desert B more likely have the greater average wind speed?

A. Desert A, because the areas in that desert had greater average dune heights.
B. Desert A, because the areas in that desert had lesser average dune heights.
C. Desert B, because the areas in that desert had greater average dune heights.
D. Desert B, because the areas in that desert had lesser average dune heights.

38. According to Figure 3, across the 25 km wide cross section of dunes on Titan and in Desert A, how does the surface elevation of the Titan dunes differ, if at all, from the surface elevation of the Desert A dunes? The surface elevation of the Titan dunes is:

F. the same at all distances.
G. greater at all distances.
H. less at all distances.
J. greater at some distances but less at other distances.

39. Consider in Figure 2 the greatest average dune height shown for an area of Titan dunes. That height is how many times higher than the greatest average dune height shown for an area of Desert C dunes?

A. Less than 2 times as high
B. Between 2 and 3 times as high
C. Between 3 and 5 times as high
D. More than 5 times as high

40. The 2 quantities for dunes that are defined in Figure 1—dune spacing and dune height—are directly analogous to which 2 quantities for electromagnetic waves?

	dune spacing	dune height
F.	amplitude	wavelength
G.	wavelength	amplitude
H.	frequency	amplitude
J.	wavelength	frequency

END OF TEST 4

STOP! DO NOT RETURN TO ANY OTHER TEST.

Form 18D
ACT® Writing Test Prompt
(December 2012)

Educators debate whether high school students should be allowed to listen to audio recordings of literary works instead of reading assigned works of literature. Some educators support allowing students to listen to audio recordings of literature instead of reading assigned works because they think audio books, like theatrical productions, offer a way to increase students' interest in literature by bringing stories and literary characters to life. Other educators do not support allowing students to listen to audio recordings of literature instead of reading assigned works because they think that, in order to be best prepared for college or the workplace, students need to take every opportunity to work on improving their reading skills. In your opinion, should high school students be allowed to listen to audio recordings of literary works instead of reading assigned works of literature?

In your essay, take a position on this question. You may write about either one of the two points of view given, or you may present a different point of view on this question. Use specific reasons and examples to support your position.

English				Mathematics				Readling		Science	
1	C			1	C	31	E	1	C	1	B
2	G			2	G	32	J	2	F	2	G
3	C			3	D	33	A	3	C	3	D
4	F			4	J	34	H	4	J	4	J
5	A			5	B	35	C	5	D	5	A
6	H	41	C	6	F	36	J	6	H	6	J
7	A	42	H	7	C	37	B	7	C	7	A
8	G	43	D	8	G	38	K	8	G	8	H
9	B	44	J	9	A	39	B	9	A	9	A
10	F	45	A	10	J	40	G	10	F	10	J
11	B	46	F	11	E	41	D	11	B	11	C
12	F	47	D	12	H	42	J	12	J	12	H
13	C	48	G	13	C	43	A	13	D	13	A
14	J	49	D	14	H	44	K	14	F	14	F
15	D	50	G	15	E	45	B	15	C	15	C
16	J	51	A	16	F	46	F	16	G	16	G
17	A	52	H	17	A	47	C	17	B	17	D
18	H	53	C	18	G	48	F	18	G	18	H
19	D	54	F	19	D	49	E	19	A	19	A
20	G	55	D	20	K	50	K	20	J	20	G
21	B	56	G	21	B	51	A	21	D	21	A
22	J	57	B	22	G	52	F	22	H	22	G
23	B	58	H	23	E	53	D	23	A	23	B
24	G	59	B	24	J	54	G	24	J	24	H
25	C	60	F	25	D	55	D	25	B	25	C
26	F	61	B	26	H	56	J	26	F	26	J
27	D	62	G	27	E	57	E	27	D	27	C
28	J	63	B	28	G	58	K	28	H	28	F
29	D	64	G	29	C	59	A	29	D	29	C
30	J	65	A	30	H	60	F	30	F	30	G
31	B	66	H					31	C	31	B
32	G	67	D					32	G	32	F
33	C	68	F					33	B	33	D
34	F	69	C					34	J	34	J
35	C	70	J					35	A	35	A
36	H	71	C					36	F	36	J
37	D	72	F					37	D	37	A
38	G	73	A					38	F	38	J
39	D	74	J					39	A	39	D
40	H	75	C					40	G	40	G

Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it off to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 71A	Your Scale Score
English	
Mathematics	
Reading	
Science	
Sum of scores	
Composite score (sum ÷ 4)	

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

微信号：loviact

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	59-60	40	40	36
35	73-74	57-58	39	39	35
34	72	56	38	38	34
33	71	54-55	37	—	33
32	70	53	36	37	32
31	69	52	35	36	31
30	67-68	51	34	35	30
29	66	49-50	33	34	29
28	65	47-48	32	33	28
27	63-64	44-46	31	31-32	27
26	61-62	41-43	30	30	26
25	59-60	38-40	29	28-29	25
24	56-58	35-37	27-28	25-27	24
23	54-55	33-34	26	24	23
22	51-53	31-32	25	22-23	22
21	48-50	30	23-24	20-21	21
20	44-47	28-29	22	18-19	20
19	42-43	26-27	21	17	19
18	40-41	24-25	19-20	15-16	18
17	38-39	21-23	18	14	17
16	35-37	17-20	17	13	16
15	32-34	13-16	15-16	12	15
14	29-31	10-12	14	11	14
13	27-28	8-9	12-13	10	13
12	25-26	7	10-11	9	12
11	23-24	5-6	9	8	11
10	20-22	4	7-8	7	10
9	18-19	—	6	5-6	9
8	15-17	3	—	—	8
7	12-14	—	5	4	7
6	10-11	2	4	3	6
5	8-9	—	3	2	5
4	6-7	1	—	—	4
3	4-5	—	2	1	3
2	2-3	—	1	—	2
1	0-1	0	0	0	1